facilities-based competitors (and higher concentration) than areas that have a high population density.[153] For an entrant to survive in the market, the market must be large enough for a potential entrant to recoup its network deployment costs over time from service revenues. Costs that delay entry, sometimes referred to as "adjustment costs," are relevant for estimating exactly when entry will occur.[154] One role of competition policy is to estimate how the timing of entry depends on various costs and to determine whether there are any relevant regulatory policy tools that can reduce entry delay.[155] Below, we briefly discuss the major costs of setting up a network and gaining a customer base.

62. *Spectrum.* A potential facilities-based entrant to a wireless service market can obtain spectrum in several ways including purchasing licenses at Commission auctions, purchasing licenses in the secondary market, and leasing spectrum in the secondary market. For instance, in the two recent major spectrum auctions, the average price ranged from $0.53/MHz-POP for the AWS-1 (Advanced Wireless Service) band (1700/2100 MHz band) in Auction 66 to $1.28/MHz-POP for the 700 MHz band in Auction 73.[156] At these prices, aggregating a significant regional spectrum footprint would involve an outlay of hundreds of millions of dollars and a national footprint would require billions of dollars. Leasing spectrum in the secondary market can reduce initial spectrum acquisition costs, distributing the costs over time. Some companies, such as Spectrum Bridge, Inc., provide online marketplaces for spectrum exchange.[157] Additional information about spectrum can be found in Section VII.A.1.

63. *Network Coverage.* To create a customer base, a new facilities-based entrant must provide network coverage that is sufficient to attract new customers, including enticing customers to switch from their existing service providers.[158] Major network deployment costs include cell site acquisition, preparation, engineering, and construction. Network cost studies analyze cost scenarios under diverse sets of assumptions. One network cost study estimates that the total capital cost of deploying a single cell site, on average, can be upwards of $200,000.[159] Regional wireless providers typically have hundreds or thousands of sites and national providers have tens of thousands of sites. A new entrant would therefore need to invest tens or hundreds of millions of dollars in capital expense for a

(Continued from previous page)
Subcommittee Telecommunications and the Internet, Hearing on "An Examination of Competition in the Wireless Industry," May 7, 2009, at 5, (estimating that three to five nationwide carriers will be able to provide mobile services, including mobile broadband).

[153] *See* Section III.C, Horizontal Concentration, *infra*.

[154] *See* Dennis W. Carlton, *Why Barriers to Entry are Barriers to Understanding*, American Economic Review, 2004, 94: 2, at 468-469 (*Barriers to Understanding*). *See also* R. Preston McAfee, *et al.*, *What Is a Barrier to Entry?*, American Economic Review, 2004, 94: 2, at 463 (*What is a Barrier to Entry?*).

[155] *See, e.g.*, *Barriers to Understanding*, at 469; Malcolm B. Coate, *Theory Meets Practice: Barriers to Entry in Merger Analysis*, Review of Law and Economics, vol. 4, Feb. 2008, at 190; *What is a Barrier to Entry?*, at 463-465. The difference between an adjustment cost and a barrier to entry (*i.e.* a permanent asymmetry in firms' costs) may, in practice, be a matter of degree, depending on the length of the delay caused by the adjustment cost. *See What is a Barrier to Entry?*, at 464 (arguing that economies of scale are not barriers to entry), and 465 (arguing that sunk costs cause firms to delay entry because of their option value).

[156] This was calculated by dividing the total net auction revenue by spectrum bandwidth and population in the year 2000.

[157] Spectrum Bridge Inc.'s online market exchange, SpecEx, can be accessed at http://www.specex.com/Default.aspx (visited Oct. 18, 2010).

[158] A scale effect can occur when positive network externalities increase with the size of the network, a relationship known as "network effects." *See Competition Policy*, at 82 (stating that greater network coverage, by increasing the pool of network users, increases the quality of the service, and, hence, the benefits consumers derive from the good).

[159] *See* Comments of Mobile Satellite Ventures Subsidiary LLC, WT Docket No. 06-150, Service Rules for the 698-746, 747-762 and 777-792 MHz Bands (filed June 20, 2008), at 49 (*MSV 700 MHz Comments*).

regional network (depending on the size of the regions) and billions of dollars for a national network. We note that roaming on competitors' networks can offer entrants access to greater network coverage while they are deploying their own networks. Service providers, including new entrants to a mobile wireless market that typically deploy their planned networks gradually, may seek access to networks besides their own in order to achieve a competitive level of coverage while their network is being built out. Roaming can increase network coverage by allowing the entrant's customers to have network coverage when they travel outside of the range of the entrant's own network.[160]

64. Entrants often use backhaul provided by other firms, especially if construction of separate backhaul facilities is not cost-justified given the size of the market. Backhaul can be a significant cost for new entrants. Estimates of average monthly costs range from hundreds of dollars (for a T1 line) to $6,000.[161] The costs can vary widely by market and provider, and may affect the ability of entrants to compete successfully. Overall cell site and backhaul costs also depend on the spectrum held by new entrants.[162] For instance, a new entrant with more spectrum bandwidth would be able to reduce its cell site and backhaul costs by deploying fewer cell sites and potentially fewer backhaul transmission lines for a given traffic volume. Additionally, a new entrant utilizing spectrum only in higher frequency bands may need to deploy more infrastructure, including cell sites to cover the same land area and therefore incur higher cell site costs, compared to providers using lower band spectrum. Additional discussions on cell site deployment and backhaul facilities can be found in Section VII.A.

65. *Handsets and Devices.* Mobile handsets and devices are the end points of mobile wireless networks that connect consumers to the networks.[163] They directly affect the quality of a consumer's mobile wireless experience, and, hence, they factor into a consumer's choice of a wireless provider. Depending on the market strategy of the entrant, its portfolio of handsets and devices may be a significant non-price factor affecting its ability to compete for customers.[164] Although handset manufacturers sell many handsets to any service provider with a compatible network, some handsets are subject to exclusivity arrangements that restrict their distribution to a single service provider in the United States.[165] Exclusive handset arrangements held by existing providers could potentially create an entry barrier if lack of access to the exclusive technology were to delay the entry of potential entrants.[166]

66. *Marketing and Distribution.* The ability of a potential entrant to compete for customers is also influenced by its expenditures on marketing and the development of its Internet and non-Internet sales and distribution networks. Marketing expenditures help to distribute product information and promote brand recognition. Marketing expenditures are a significant factor of non-price competition in

---

[160] *See* Section IV.B.1.d, Roaming, *infra*, for an additional discussion of roaming.

[161] *See Fourteenth Report*, 25 FCC Rcd at 11459, ¶ 64.

[162] *See* Section VII.A.1, Spectrum, *infra.*

[163] *See* Sections IV.B.3, Differentiation in Mobile Wireless Handsets/Devices and VII.B.1, Mobile Wireless Handsets/Devices and Operating Systems, *infra*, for a more detailed discussion of handsets and devices.

[164] According to the Nielsen Company's Mobile Insights survey, in the first quarter of 2009, the specific handset was the seventh ranking factor in consumers' choice of a provider. Roger Entner, *When Choosing A Carrier Does the iPhone Really Matter?*, Nielsen Wire, Aug. 10, 2009 (citing data from The Nielsen Company's Mobile Insights survey).

[165] *See* Section VII.B.1, Mobile Wireless Handsets/Devices and Operating Systems, *infra.*

[166] Lack of access to a particular good due to a legal restriction may have an effect on potential entrants similar to the good having a high price. However, *see Competition Policy*, at 378 (stating that it is well-known that exclusivity agreements can benefit innovation and consumers; the trade-offs must be evaluated in a case-by-case cost-benefit analysis).

the mobile wireless industry.[167] The size of a provider's sales and distribution networks is one measure of the provider's penetration of the market. An entrant that has an existing customer base for other telecommunication services (for example, Cox Communications, discussed below) may expect to have lower expenditures on marketing, sales, and distribution than an entrant that does not have a customer base in potentially complementary telecommunications services that can be marketed in bundles. Marketing and advertising expenditures by mobile wireless service providers are discussed below.[168]

E. Recent Entry and Exit

1. Entry

67. Data and information about the stages a firm has completed in the entry process can provide valuable information for estimating the timeframe during which entry will be completed. Entry normally proceeds through several stages that require a significant period of time to complete, including raising financial capital, acquisition of spectrum rights,[169] deployment of the mobile wireless network, and a product launch stage during which a customer base is gained. In addition, technological advances can impact the degree of entry, not only for potential entrants, but also for incumbent firms. For example, significant capital expenditures are involved with the "switchover" to a new technology, or upgrading of existing network infrastructure.[170] Analysis of when entry will occur can be likened to a "pipeline" that is marked by increasing financial commitments and the completion of the various stages.[171] In particular, estimating the date of potential entry is one factor in a more comprehensive entry analysis that predicts how soon there will be new rivals who are in a position to place competitive constraints on the existing competitors.[172] Below we summarize entry commitments that are large enough to be consistent with entry that could introduce new competitive constraints at the regional or national level.

68. *Clearwire Corporation.* In 2009, Clearwire's services consisted primarily of wireless (mobile and fixed) broadband data in the 2.5 GHz band. The company also offered a fixed wireless VoIP service, but not an interconnected mobile voice service.[173] As of October 2010, Clearwire was providing

---

[167] *See Barriers to Understanding*, at 467 (Advertising, like investments that raise product quality, is as common a competitive behavior in high-technology industries as price competition is in industries that are characterized by less product innovation). *See also Modern Industrial Organization*, at 80 (If an incumbent has never had any rivals [*i.e.* it is a monopolist] then asymmetries in advertising costs between the incumbent and entrant can constitute a barrier to entry, because the monopolist has never had to bear these costs). However, the wireless telephony/broadband market is not a monopoly, and incumbent providers incur significant advertising costs as a component of their rivalry.

[168] *See* Section IV.B.2IV.B.2, Advertising, Marketing, Sales Expenditures, and Retailing, *infra.*

[169] We note that acquisition of spectrum, in itself, is not necessarily a good predictor of timely entry into a market. For a discussion of the discrepancy between the spectrum license coverage of some facilities-based providers and their network coverage, see Section VII.A.1, Spectrum, *infra*.

[170] For example, Sprint Nextel recently announced that it is investing $4 -5 billion to upgrade its infrastructure by "consolidating multiple network technologies into one, seamless network." *Sprint Announces Network Vision – A Cutting-Edge Network Evolution Plan With Partners Alcatel-Lucent, Ericsson and Samsung*, News Release, Sprint Nextel, Dec. 6, 2010, *available at* http://newsroom.sprint.com/news/sprint-announces-network-vision-network-evolution-plan.htm.

[171] *See Theory Meets Practice*, at 206.

[172] *Id.* at 190.

[173] Clearwire Corp., SEC Form 10-K, filed Mar. 26, 2009, at 3, 9 ("Mobile WiMAX technology enables us to offer mobile and fixed communications services over a single wireless network."); Clearwire Corp., SEC Form 10-K, filed Feb. 24, 2010, at 8; Clear, *Mobile Internet*, http://www.clear.com/shop/services/mobile, (visited Apr. 20, 2010); Clear, *Home Internet*, http://www.clear.com/shop/services/home, (visited Apr. 20, 2010). Clear, *Devices*, http://www.clear.com/shop/devices, (visited Sep. 22, 2010).

mobile data services in 74 markets across the United States and deploying its mobile wireless network using the 802.16e mobile WiMAX technology.[174] Clearwire also sells wholesale WiMAX services to Sprint Nextel and other service providers.[175] At year-end 2008, Clearwire had 475,000 retail subscribers. By year-end 2009, Clearwire had 688,000 subscribers, an increase of 45 percent. As of November 1, 2010, Clearwire's WiMAX networks where Clearwire has commercially launched cover an estimated 82 million people, with approximately 1 million retail and 1.8 million wholesale subscribers.[176] Clearwire has wholesale service agreements with its investors under which they can resell wireless broadband services to their respective end user customers. For example, Clearwire has an MVNO agreement with Sprint Nextel under which Sprint Nextel can purchase mobile broadband data services from Clearwire for resale to consumers, and Clearwire can purchase CDMA EV-DO mobile wireless voice and data services from Sprint Nextel for resale to consumers.[177] In recent transactions, the Commission's concentration and spectrum analysis has attributed Clearwire to Sprint Nextel because Sprint Nextel owns more than a 10 percent equity interest in Clearwire.[178] Furthermore, as of the fourth quarter of 2010, one member of the board of directors of Sprint Nextel is also a member of the board of directors of Clearwire.[179]

69. *Leap and MetroPCS.* The entry of current facilities-based providers into new geographic markets is an important form of entry.[180] Leap and MetroPCS are metropolitan area service providers that have recently invested in new markets. Leap states that its business model is to keep "costs low by engineering high-quality, efficient networks covering only the urban and suburban areas where its potential customers live, work and play enabling it to sell its wireless minutes for less than it costs other carriers to produce theirs,"[181] and "provide customers with unlimited wireless services for a flat rate without requiring a fixed-term contract or a credit check."[182] Leap, under the brand name Cricket, holds PCS and AWS licenses covering markets throughout much of the country, and has expanded its coverage from approximately 53.9 million POPs in October 2008 to 80.5 million POPs in October 2009, an

---

[174] *See* Clearwire, *Coverage Map*, http://www.clear.com/coverage (visited Oct. 21, 2010).

[175] *See* Section IV.B.1.a, Service Provider Technology Deployments, *infra.*

[176] *See Clearwire Reports Record Subscriber and Revenue Growth in Third Quarter 2010*, Press Release, Clearwire, Nov. 4, 2010. The figure for wholesale subscribers includes users of multi-mode 3G/4G devices in areas where Clearwire has not yet launched 4G service, but from whom it currently expects to receive nominal revenue. As of September 30, 2010, approximately 45 percent of the company's wholesale subscribers resided outside of Clearwire's launched markets. These networks include, among others, Atlanta, Baltimore, Charlotte, Chicago, Dallas, Honolulu, Houston, Kansas City, Las Vegas, Philadelphia, Portland, Oregon, Salt Lake City, San Antonio, Seattle, St. Louis, and Washington D.C.

[177] Clearwire Corp., SEC Form 10-K, filed Mar. 26, 2009, at F-17.

[178] *See* Clearwire Corporation, SEC Form 10-Q, filed Aug. 5, 2010, at 22. As of June 30, 2010, Sprint owned the largest interest in Clearwire with an effective voting and economic interest in Clearwire of approximately 53.9 percent and Intel, Google, Comcast, Time Warner Cable, Bright House Networks and Eagle River collectively owned a 31.8 percent interest in Clearwire. An executive vice president of Intel and the CEO of Eagle River are also on the board of directors for Clearwire.

[179] Frank Ianna. *See* http://investors.clearwire.com/phoenix.zhtml?c=198722&p=irol-govboard and http://www.sprint.com/governance/board/ (visited Oct. 21, 2010).

[180] For example, the *Twelfth Report* discusses how, following the acquisition of new spectrum holdings in 2006, T-Mobile, Leap, and MetroPCS entered new markets. *See Twelfth Report*, 23 FCC Rcd at 2265, ¶ 75. *See also* Cellular South, *About Us*, https://www.cellularsouth.com/aboutus/index.html (visited Jan. 4, 2010) (stating that, since 2006, Cellular South has significantly increased the size of its regional coverage).

[181] Leap, *About Leap*, http://www.leapwireless.com/l1_about_leap.htm (visited Jan. 13, 2010).

[182] Leap Wireless International Inc., SEC Form 10-K, filed Mar. 1, 2010, at 1. Verizon Wireless claims that Leap and MetroPCS have been achieving penetration rates of between eight and 13 percent in markets where they have been active for five or more years. *See Fourteenth Report*, 25 FCC Rcd at 11462, n. 175.

increase of 26.6 million. In 2010, Leap began offering their customers service plans with nationwide voice roaming, including in Alaska, Hawaii and Puerto Rico. As of June 30, 2010, Leap had 5.3 million subscribers, a 16.5 percent increase from June 2009.[183]

70. MetroPCS states that it provides mobile wireless services in "selected major metropolitan areas in the United State[s,]" and it provides "a variety of wireless communications services to our subscribers on a no long-term contract, paid-in-advance, flat-rate, unlimited usage basis."[184] MetroPCS, which holds PCS and AWS spectrum in many markets throughout the United States, has expanded its facilities-based coverage from 56 million POPs in October 2008 to approximately 146 million in October 2010. As of the fourth quarter 2010, MetroPCS became the first U.S. facilities-based provider to launch a network using LTE technology, and has launched its LTE network in nine major metropolitan areas – Las Vegas, Dallas/Fort Worth, Detroit, Los Angeles, Philadelphia, San Francisco, Boston, New York and Sacramento.[185] As of the end of June 2010, MetroPCS had 7.6 million subscribers.[186]

71. *Atlantic Tele-Network (ATN).* The acquisition of 26 of the divestiture markets from the Verizon-Alltel transaction by ATN, which was consummated in April 2010, led to a new entrant in the U.S. mobile wireless retail services marketplace. Through this acquisition of the Alltel divestiture markets, "ATN offers wireless voice and data services to retail customers under the 'Alltel' name in rural markets located principally in the Southeast and Midwest. Additionally, through another affiliate, Commnet, the Company offers wholesale wireless voice and data roaming services to national, regional and local wireless carriers in rural markets located principally in the Southwest and Midwest U.S." As of June 30, 2010, ATN had approximately 807,000 subscribers, making them the ninth largest mobile wireless facilities-based provider, with a network footprint covering approximately six million POPs.[187]

72. *Cox Communications.* Cox Communications (Cox) invested more than $500 million in spectrum in the AWS and 700 MHz bands and the development of infrastructure in 2006 and 2008.[188] In 2009, Huawei Technologies announced that it had signed a contract with Cox to supply CDMA 1x and EV-DO network infrastructure and equipment for a Cox mobile wireless network,[189] and Cox began market testing its mobile wireless service.[190] However, in May 2011, Cox announced that it would

---

[183] As of September 30, 2010, Cricket covered 35 states and the District of Columbia and had approximately 5.1 million customers. In addition, Cricket has various roaming relationships as well as a wholesale agreement with Sprint Nextel to allow them to offer their wireless services outside their current network footprint. *See* Leap Wireless International Inc., SEC Form 10-Q, filed Nov. 3, 2010.

[184] MetroPCS Communications Inc., SEC Form 10-K, filed Mar. 1, 2010, at 5.

[185] *See* Section IV.B.1, Service Provider Technology Deployments, *infra.*

[186] MetroPCS, *SEC Form 10-Q*, http://investor.metropcs.com/phoenix.zhtml?c=177745&p=irol-irhome (visited Oct. 21, 2010).

[187] *See* Atlantic Tele-Network, SEC Form 10-Q, http://ir.atni.com/financials.cfm (visited Oct. 21, 2010), at 7, 21.

[188] *Cox to Launch Next Generation Bundle with Wireless in 2009*, Press Release, Cox, Oct. 27, 2008. Cox holds the spectrum through the SpectrumCo LLC joint venture, the entity that purchased the AWS spectrum at the Commission's 2006 AWS-1 Auction and originally included three other cable operators. The other operators subsequently left the SpectrumCo venture, and Cox is the only remaining member. Marguerite Reardon, *Cox Wireless Coming in March*, CNET News, Jan. 14, 2010, *available at* http://news.cnet.com/8301-30686_3-10434831-266.html.

[189] *See Huawei to Provide CDMA Technology for Cox Communications' Wireless Network*, Press Release, Huawei Technologies, Apr. 1, 2009. *See also* Amol Sharma and Sarah Silver, *Huawei Tries to Crack U.S. Market*, Wall Street Journal, Mar. 26, 2009, at B2.

[190] *See* Cox Enterprises, *2009 Annual Report*, http://www.coxenterprises.com/media/35045/cox_09_annual.pdf (visited Oct. 21, 2010). Cox also announced that it conducted LTE trials in Phoenix and San Diego in 2010. *Cox Successfully Demonstrates the Delivery of Voice Calling, High Definition Video Via 4G Wireless Technology,* Press Release, Cox, Jan. 25, 2010, *available at* http://coxenterprises.mediaroom.com/index.php?s=43&item=841.

abandon its plans to build its own wireless network and would instead resell Sprint Nextel's mobile wireless services.[191] Cox Enterprises, the parent company of Cox Communications, has stated that it plans to bundle mobile wireless services with other Cox products and initially target these services at its existing customer base.[192] Cox currently has about six million customers for its cable and broadband products. As of May 2011, Cox was offering mobile wireless voice and high-speed Internet access services in Hampton Roads, Virginia; Omaha, Nebraska; Orange County, California; Oklahoma City and Tulsa, Oklahoma; Cleveland, Ohio; Rhode Island; and the communities it serves in Connecticut.[193]

2. Exit

73. Exit of service providers – whether through mergers, acquisitions, or discontinuance – affects the structure of the mobile wireless market and potentially exerts both negative and positive effects on competitive performance and consumer welfare, depending on details of the pre- and post-exit competitors in the market.[194] The main potential negative effects of the exit of a competitor is that with fewer competitors remaining in the market, there is an increased possibility of higher prices, reduced quality of services, or a slower rate of innovation. The main potential positive effects of the exit of a competitor occur in the context of a merger or acquisition that creates a stronger post-merger entity due to cost efficiencies or greater network coverage.[195]

74. Since mergers and acquisitions can simultaneously exhibit both these positive and negative effects, merger analysis typically involves a detailed analysis to evaluate the magnitude of the opposing effects and determine whether, on balance, the effects of the merger are positive or negative. If the cost savings generated by consolidation endow the merged provider with the ability to compete more effectively, consolidation could result in lower prices and new and innovative services for consumers.[196] However, if the consolidation substantially increases the size of the firm, there may be reduced competitive pressure on the firm, potentially leading to higher consumer prices and/or lower incentive to improve its consumer services.[197] Service providers in non-overlapping geographic markets are not considered competitors for present purposes.

75. *Mergers and Acquisitions*. Facilities-based providers have expanded their network coverage and capacity through mergers and acquisitions, as well as through increased investment and expansion of their existing assets. Over the years, the four current nationwide facilities-based providers have all employed mergers or acquisitions as a growth strategy to realize nationwide networks.[198] A

---

[191] *See* Ed Hansberry, *Cox Abandons 3G Network*, InformationWeek, May 25, 2011, at http://www.informationweek.com/news/mobility/3G/229625643; Alex Sherman, *Cox Communications Stops Building 3G Network, Will Use Sprint's*, Bloomberg, May 24, 2011, at http://www.bloomberg.com/news/2011-05-24/cox-communications-stops-building-3g-network-will-use-sprint-s.html.

[192] *See* Cox Enterprises, *2008 Annual Report*, http://www.corporatereport.com/cox2008/index.html (visited Apr. 20, 2010) at 3.

[193] *See Cox Launches Wireless in Rhode Island, Connecticut, Cleveland*, Press Release, Cox, May 17, 2011; *Cox Unveils Unprecedented "Unbelievably Fair (SM) Wireless Plans, Bringing More Value To The Bundle*, Press Release, Cox, Nov. 19, 2010, *available at* http://cox.mediaroom.com/index.php?s=43&item=516; Cox, *Unbelievably Fair Wireless*, http://www.unbelievablyfairwireless.com/ (visited Feb. 23, 2011).

[194] Spectrum transfers (*i.e.*, the assignment of licenses from one firm to another) are discussed further in Section VII.A.1, Spectrum, *infra*.

[195] *See Competition Policy*, at 238. *See also* Daniel Birke and G. M. Peter Swann, *Network Effects and the Choice of Mobile Phone Operator*, Journal of Evolutionary Economics, 2006, 16: 65 – 84.

[196] *See* Baker, J. B., *Developments in Antitrust Economics*, Journal of Economic Perspectives, 1999, 13: 1, 182.

[197] *See Economics of Regulation and Antitrust*, at 126.

[198] *See* Section III.B.1, Facilities-Based Providers, *supra*, for a discussion of the term "nationwide."

summary of significant mergers or acquisitions since 2005 involving a nationwide facilities-based provider and the exit of another facilities-based provider appears in Table 10 below.[199] This table indicates the extent to which each of the four nationwide facilities-based providers has used mergers or acquisitions to expand coverage since 2005. In many instances, the entities that were combined had not previously competed in the same geographic market. As a result, these transactions resulted in the expansion of the coverage of the newly combined entity. In markets where the entities were significant competitors, the Commission may have required divestitures in specified markets as conditions of the transaction in order to prevent competitive harm.[200] Below we summarize these transactions and report on the status of divestitures that were required in some recent transactions.[201]

Table 10
Selected Mergers and Acquisitions: 2005-2010

Year of Commission Approval	Merger
2005	Sprint/Nextel
2007	AT&T/Dobson
2008	AT&T/Aloha T-Mobile/Suncom Verizon Wireless/Rural Cellular Verizon Wireless/Alltel Sprint Nextel/Clearwire
2009	AT&T/Centennial
2010	AT&T/Verizon-Alltel ATN/Verizon-Alltel Sprint/iPCS

76. *AT&T/Centennial.* On November 5, 2009, the Commission consented with conditions to AT&T's acquisition of Centennial Communications Corp. (Centennial), and on November 6, 2009, AT&T completed its acquisition of Centennial, with Centennial shareholders receiving approximately $945 million in cash in exchange for their shares.[202] Centennial held Cellular, PCS, and AWS spectrum

[199] The Commission must consent to the transfer of control or assignment of all non pro-forma spectrum licenses used to provide wireless telecommunications services. 47 C.F.R. § 1.948.

[200] *See, e.g., AT&T-Centennial Order,* 24 FCC Rcd 13915.

[201] In addition, in December 2010, AT&T announced its intention to acquire Qualcomm's licenses in the Lower 700 MHz band, which cover more than 300 million people, for $1.925 billion. On March 20, 2011, AT&T announced its intention to acquire T-Mobile, the fourth largest mobile wireless provider, for $39 billion, subject to regulatory approval. Applications for approval of these two transactions are currently pending before the Commission. *See* "AT&T Mobility Spectrum LLC and Qualcomm Incorporated Seek FCC Consent to the Assignment of Lower 700 MHz Band Licenses," WT Docket No. 11-18, *Public Notice*, 26 FCC Rcd 1335 (2011); "Commission Opens Docket for Proposed Transfer of Control of T-Mobile USA, Inc. and Its Subsidiaries from Deutsche Telekom AG to AT&T Inc.," WT Docket No. 11-65, *Public Notice*, DA 11-673 (rel. Apr. 14, 2011).

[202] *AT&T Completes Acquisition of Centennial Communications*, Press Release, AT&T, Nov. 6, 2009. *See also* AT&T Inc., SEC Form 8-K, filed Nov. 6, 2009.

and EBS spectrum leases, and provided voice and data wireless service to approximately 633,100 wireless customers in parts of Indiana, Michigan, Ohio, Louisiana, Mississippi, and Texas using GSM technology.[203] Centennial also provided mobile wireless service to approximately 424,400 subscribers in Puerto Rico and the U.S. Virgin Islands using CDMA-track technology.[204] The Commission determined that competitive harm was unlikely in most mobile wireless markets as a result of the *AT&T/Centennial* transaction, and that the public interest, convenience, and necessity were served by the transaction, subject to certain conditions imposed in the Commission's *Memorandum Opinion and Order*.[205] To remedy likely anti-competitive harms in particular geographic markets, the Commission required AT&T to divest Centennial's mobile wireless assets in seven CMAs, six in Louisiana and one in Mississippi.[206]

77. *Verizon Wireless/Alltel*. The Commission approved the Verizon Wireless/Alltel transaction on November 4, 2008.[207] The Commission conditioned its approval of the transaction on the companies divesting the licenses and related operational and network assets in five markets where the Commission found potential for competitive harm.[208] The Commission also conditioned the transaction on the companies' voluntary commitment to divest the licenses and related operational and network assets in 105 markets and on Verizon Wireless's voluntary commitments with respect to providing roaming services to other providers.[209] The companies closed their transaction on January 9, 2009.[210]

78. *Divestitures*. The divestitures of the mobile wireless assets by Verizon Wireless and AT&T – as conditions of the *Verizon Wireless/Alltel* and *AT&T/Centennial* transactions, respectively – had all received regulatory approval (by the Commission and the DOJ) as of October 2010.[211] Verizon Wireless divested 79 of the 105 CMAs to AT&T and the remaining 26 CMAs to ATN.[212] AT&T divested

---

[203] *AT&T-Centennial Order*, 24 FCC Rcd at 13919, ¶ 8.

[204] *Id.* at 13919, ¶ 9.

[205] *Id.* at 13981, ¶ 166.

[206] *Id.* at 13961, ¶ 111. The DOJ required divestiture in an additional market in Mississippi. *Id.* at 13926, ¶ 23.

[207] *Verizon Wireless-Alltel Order*, 23 FCC Rcd at 17546-47 ¶ 233.

[208] *Id.* at 17491-93, ¶¶ 100-106.

[209] *See id.* at 17515-16, 17524-25, 17546-47, ¶¶ 157, 178-181, 233. The Commission conditioned its approval of the transaction on Verizon Wireless's compliance with a voluntary commitment to phase out its requests for federal high-cost universal service support over a five-year transition period and with a voluntary commitment to use counties for measuring compliance with the Commission's wireless E911 location accuracy rules governing handset-based technologies. *Id.* at 17532-33, ¶¶ 197 & 201.

[210] *Verizon Wireless Completes Purchase of Alltel; Creates Nation's Largest Wireless Carrier*, Press Release, Verizon Wireless, Jan. 9, 2009.

[211] For a discussion of the divestiture requirements of these transactions, *see* Applications of Cellco Partnership d/b/a Verizon Wireless and Rural Cellular Corporation for Consent to Transfer Control of Licenses, Authorizations, and Spectrum Manager Leases and Petitions for Declaratory Ruling that the Transaction Is Consistent with Section 310(b)(4) of the Communications Act, WT Docket No. 07-208, *Memorandum Opinion and Order and Declaratory Ruling*, 23 FCC Rcd 12463, 12512-15, ¶¶ 110-122 (2008); *Verizon Wireless-Alltel Order*, 23 FCC Rcd at 17491-93, 17515-18, ¶¶ 99-106, 157-162; *AT&T-Centennial Order*, 24 FCC Rcd at 13960-63, ¶ 109-119.

[212] *See* Applications of AT&T Inc. and Cellco Partnership d/b/a Verizon Wireless for Consent to Assign or Transfer Control of Licenses and Authorizations and Modify a Spectrum Leasing Arrangement, WT Docket No. 09-104, *Memorandum Opinion and Order*, 25 FCC Rcd 8704 (2010) (*Verizon Wireless – AT&T Order*); Applications of Atlantic Tele-Network, Inc. and Cellco Partnership d/b/a Verizon Wireless for Consent to Assign or Transfer Control of Licenses and Authorizations, WT Docket No. 09-119, *Memorandum Opinion and Order*, 25 FCC Rcd 3763 (2010); "Wireless Telecommunications Bureau and International Bureau Grant Consent for the Transfer of Control and Assignment of Licenses and Authorizations from AT&T Inc. to Texas 10, LLC," WT Docket No. 10-78, *Public Notice*, 25 FCC Rcd 10978 (2010).

five of the eight Centennial CMAs to Verizon Wireless and the remaining three CMAs to Cellular One MTPCS (Texas 10, formerly branded as Chinook).[213] Cellular One MTPCS provides service to customers in Montana, Texas, Oklahoma and Wyoming and is a new entrant into Louisiana through the AT&T/Centennial divestitures.[214]

79. *Exit.* On October 4, 2010, Pocket Communications (Pocket) announced that it would be exiting the market on October 31, 2010. Pocket had operated in south Texas and in parts of the Northeast. In July 2010, Leap and Pocket entered into a joint venture that transferred Pocket's Texas spectrum to the joint venture.[215] MetroPCS has applied to acquire Pocket's licenses in the Northeast.[216] In addition, three other small firms exited the market in 2010: XIT Cellular from two markets in Texas, Caprock Cellular from one market in Texas, and SLO Cellular (Cellular One of San Luis Obispo) from one market in California. AT&T has applied to acquire the respective licenses associated with these exits.[217]

IV. MOBILE WIRELESS SERVICES: PROVIDER CONDUCT

80. In addition to industry structure, a second key element of our analysis of competition in mobile wireless services is an examination of the conduct of mobile wireless services providers—in particular, whether they engage in price and non-price rivalry. During 2008 and 2009, mobile wireless service providers continued to compete on the basis of price as well as on various non-price factors, which are discussed in detail below. Non-price factors include technology deployment and network upgrades, product information and perception (advertising and marketing strategies), and downstream product differentiation such as handset/device and application offerings.

A. Price Rivalry: Developments in Mobile Service Pricing Plans

81. One way that mobile wireless providers compete is through differentiated pricing plans. In the mobile wireless sector, we observe different pricing levels and structures, for varying service packages, with various handsets and policies on handset pricing. Today, all of the nationwide service providers, and many smaller operators, offer some version of a national flat-rate pricing plan in which customers can purchase a "bucket" of minutes to use on a nationwide or nearly nationwide network without incurring roaming or long-distance charges. All of the nationwide service providers also offer some version of a family plan.[218]

82. Operators have experimented with various types of "unlimited" calling options.[219] For example, some providers offer "calling circle" plans that allow subscribers unlimited free calling to and from a small number of designated numbers, regardless whether they are for wireline or wireless phone,[220] while other providers offer plans that provide for free calls only to customers who use the same

---

[213] *See* Applications of Cellco Partnership d/b/a Verizon Wireless and AT&T, Inc. for Consent to Assign or Transfer Control of Licenses and Authorizations and Request for Declaratory Ruling on Foreign Ownership, WT Docket No. 09-121, *Memorandum Opinion and Order*, 25 FCC Rcd 10985 (2010).

[214] *See* Cellular One, http://www.cellonenation.com/companyinfo.php (visited Nov. 1, 2010).

[215] Leap Wireless International Inc., SEC Form 10-Q, filed Mar. 1, 2010.

[216] *See* http://wireless2.fcc.gov/UlsApp/ApplicationSearch/searchAppl.jsp, File Number 0004421015.

[217] *See* http://wireless2.fcc.gov/UlsApp/ApplicationSearch/searchAppl.jsp, File Numbers 0004340296 and 0004340280 (AT&T/XIT application); File Number 0004284198 (AT&T/Caprock Cellular application); File Numbers 0004300558 and 0004300573 (AT&T/SLO Cellular application).

[218] *See Tenth Report*, 20 FCC Rcd at 15946, ¶ 98.

[219] *See Twelfth Report*, 23 FCC Rcd at 2292, ¶ 113.

[220] *Eleventh Report*, 21 FCC Rcd at 10984, ¶ 91. *See also* Allie Winter, *Verizon Wireless Apes Alltel's My Circle With New Small Businesses Calling Plan*, RCR Wireless News, June 11, 2008 (reporting that, in June 2008, Verizon (continued....)

mobile wireless provider ("on-net" mobile-to-mobile options).[221] In 2008, unlimited national flat-rate calling plans were launched by all the nationwide operators,[222] and then spread from postpaid service to the prepaid and reseller segment of the market.[223] Both postpaid and prepaid versions of these unlimited flat-rate plans include bundled options that combine unlimited nationwide calling with either unlimited text messaging or unlimited use of other data services as well as text messaging.[224] In 2009, Sprint Nextel launched its "Any Mobile, Anytime" feature, which allows unlimited mobile-to-mobile calling to any domestic wireless number, rather than a limited selection of designated wireless and wireline numbers.[225] Finally, a number of smaller, regional, and multi-metro providers, like Leap and MetroPCS, have been offering unlimited local calling plans.[226]

83. In addition to unlimited voice plans and bundled voice-and-data offerings, until recently all the nationwide operators also offered unlimited data plans for smartphones, and it was standard industry practice to offer only this unlimited data pricing option to smartphone users. As discussed below, the most significant development in mobile service pricing plans since the release of the *Fourteenth Report* is the introduction by three of the four nationwide service providers of tiered, usage-based data pricing for smartphone users, with AT&T no longer offering unlimited data plans to new smartphone users. Another significant development is AT&T's introduction of higher early termination fees (ETFs) for smartphone wireless service contracts, following a similar move by Verizon Wireless in late 2009. Apart from these developments in the pricing of postpaid service, the ongoing movement by the nationwide operators into the prepaid service segment continues to put pressure on smaller traditional prepaid service providers to revamp their pricing plans and lower the prices of their own unlimited prepaid service offerings.

1. Postpaid Service

84. The focus of this section of the *Report* reflects new developments in the pricing of postpaid service during the period covered by the *Report*, and accordingly varies from period to period depending on how industry pricing practices evolve. Consequently, whereas the *Fourteenth Report* included an extensive discussion of recent pricing changes and new features and options with respect to postpaid voice plans,[227] the present *Report* focuses on the industry's shift from unlimited data pricing to tiered, usage-based data pricing for smartphones.

85. *Data Plan Pricing.* Purchase of a monthly data plan is typically a requirement for smartphones such as the iPhone and its closest competitors. Until recently, the industry norm was one price plan per device, and this was an unlimited data plan.[228] Partly because of the incentives created by

(Continued from previous page)
Wireless also introduced a new plan for businesses, allowing unlimited calling between a Verizon Wireless number and up to five wireline numbers for $5 per line).

[221] *Eleventh Report*, 21 FCC Rcd at 10984, ¶ 91.

[222] *Thirteenth Report*, 24 FCC Rcd at 6244, ¶112.

[223] *Id.* at 6246, ¶118.

[224] *Id.* at 6247, ¶120.

[225] *Fourteenth Report*, 25 FCC Rcd at 11470, ¶ 90.

[226] *Id.* at 6295, ¶231.

[227] *Fourteenth Report*, 25 FCC Rcd at 11470-71, ¶¶ 90-92.

[228] Craig Moffett, *et al.*, *Quick Take – U.S. Wireless: At Last... Rationing Arrives*, Bernstein Research, June 2, 2010, at 1 (*Rationing Arrives*); Andrew Dowell, *AT&T Moves Away From Unlimited-Data Pricing*, Wall Street Journal, June 2, 2010. As discussed in the *Fourteenth Report*, beginning in January 2010 Verizon Wireless required the purchase of a 25 MB monthly data plan for its entire line of 3G "multimedia" handsets, or so-called "feature phones," but retained a requirement to purchase a more expensive unlimited monthly data plan for its line of more advanced 3G smartphones. *See Fourteenth Report*, 25 FCC Rcd at 11472, ¶ 95. The advent of tiered data pricing (continued....)

this all-you-can-eat data pricing structure, iPhone and other smartphone users consumed significantly more bandwidth than average mobile wireless subscribers and the heaviest smartphone users accounted for a disproportionate share of data traffic.[229] For example, AT&T estimated that three percent of its smartphone users were generating 40 percent of its wireless data traffic.[230] As discussed in the *Fourteenth Report*, reports suggest that bandwidth consumption by data-intensive iPhone users may have degraded service quality for those users and other mobile wireless subscribers on the network during peak periods in certain cities.[231] One analyst report explained that "... unlimited data smartphone plans have no mechanism to disincentivize heavy data users from clogging the network" because, under this pricing structure, "... no matter how much data a user consumes, they all pay the same price."[232]

86. In response, AT&T devoted a large share of its capital spending to various measures to upgrade and expand the capacity of its HSPA network, but did not change its approach to data pricing.[233] In late 2009, however, the chief executive of AT&T's wireless operations hinted that the company would eventually shift from unlimited data pricing to charging subscribers based on the amount of data used in order to encourage high-usage customers to curb demand for network capacity and improve the operator's ability to manage its network.[234] Analysts have long anticipated the introduction of usage-based wireless data pricing, arguing that a departure from the unlimited data pricing model is only a matter of time.[235]

87. In June 2010, AT&T became the first national operator to move from unlimited data pricing to usage-based tiered data pricing for smartphones.[236] Beginning June 7, 2010, AT&T eliminated its $30 per month unlimited data plan for new smartphone subscribers, and in its place, introduced a two-tiered pricing structure: an entry plan of $15 per month for 200 megabytes of data usage and a more expensive plan of $25 per month for two gigabytes. Each plan has overage charges for users who exceed their monthly data usage allotment. Users will be charged $15 for an additional 200 megabytes of data usage on the entry plan and $10 for each additional gigabyte consumed on the more expensive two-gigabyte plan. To help customers manage their data usage, AT&T alerts customers by sending free text messages when they near their limits, and provides online tools, including a smartphone application that shows monthly usage information. Smartphone customers, including iPhone customers, who choose the more expensive two-gigabyte plan also have the option to add tethering for an additional $20 per month.

(Continued from previous page)
for feature phones is also discussed in Simon Flannery, *et al.*, *Wireless Data: The Torch Passes from Voice to Data*, Equity Research, Morgan Stanley, June 1, 2010, at 14 (*Torch Passes from Voice to Data).*

[229] Tom Kaneshige, *AT&T IPhone Users Irate at Idea of Usage-Based Pricing*, PCWORLD, Dec. 14, 2009; Glenn Derene, *In Defense of AT&T's New Utility Pricing System*, Popular Mechanics, June 2010, at http://www.popularmechanics.com/print-this/defending-atts-utility-pricing-system; George Ou, *Tiered Mobile Services Could Mean Half Price for Most Users*, Digital Society, July 7, 2010; *Fourteenth Report*, 25 FCC Rcd at 11527, 11550-51, ¶¶ 182, 224.

[230] Andrew Dowell, *AT&T Moves Away From Unlimited-Data Pricing*, Wall Street Journal, June 2, 2010; Martin Peers, *AT&T Weighs the Price on Data*, Wall Street Journal, June 2, 2010; Tom Kaneshige, *AT&T IPhone Users Irate at Idea of Usage-Based Pricing*, PCWorld, Dec. 14, 2009.

[231] *Fourteenth Report*, 25 FCC Rcd at 11550-51, ¶ 224.

[232] *Torch Passes from Voice to Data*, at 15.

[233] *Fourteenth Report*, 25 FCC Rcd at 11550-51, ¶¶ 224.

[234] Tom Kaneshige, *AT&T IPhone Users Irate at Idea of Usage-Based Pricing*, PCWorld, Dec. 14, 2009.

[235] *Rationing Arrives*, at 1 (stating that "For the better part of two years, the question around usage based pricing (UBP) plans has been when, not if."); *Torch Passes from Voice to Data*, at 15.

[236] *AT&T Announces New Lower-Priced Wireless Data Plans to Make Mobile Internet More Affordable to More People*, Press Release, AT&T, June 2, 2010; Andrew Dowell, *AT&T Moves Away From Unlimited-Data Pricing*, Wall Street Journal, June 2, 2010; Martin Peers, *AT&T Weighs the Price on Data*, Wall Street Journal, June 2, 2010; *Rationing Arrives*, at 1-2.

AT&T also eliminated the $30 unlimited data option for new iPad users and replaced it with the $25 per month two-gigabyte plan.[237]

88. Existing smartphone users already on the $30 unlimited data plan could switch to the new cheaper plans, but also had the option to stay on their $30 unlimited data plans after their service contracts expire, even if they switch or upgrade devices and sign a new contract. However, they lose this option if they move to a new plan or opt for tethering.[238] Existing iPad users who already had the unlimited data plan could keep that plan or switch to the new plan with two gigabytes of data.

89. It is not clear what the impact of this new tiered pricing structure will be on data usage, consumers' monthly bills and operator revenues because it depends on the way in which both new and existing customers respond to the new price signals.[239] AT&T estimated that 98 percent of its smartphone customers currently use less than two gigabytes per month while 65 percent use less than 200 megabytes of data per month on average.[240] Accordingly, the company argued that the new tiered pricing structure could lower the cost of using smartphones for most users and encourage them to make wider use of mobile Internet services.[241] However, the company acknowledged that it is uncertain how consumers will respond to the incentives created by usage-based pricing, and views its pricing shift as an experiment in consumer behavior.[242]

90. The Nielsen Company analyzed the effects of AT&T's tiered pricing scheme using its own data on the distribution of smartphone data consumption collected from the monthly phone bills of more than 60,000 mobile customers.[243] According to Nielsen, there is a large disparity of usage among smartphone users, with the heaviest users consuming "staggering amounts of data." Average data consumption increased from about 90 MB per month during the first quarter of 2009 to 298 MB per month during the first quarter of 2010, which represents a year-on-year increase of approximately 230 percent.[244] However, the top six percent of smartphone users are consuming half of all data.[245] A quarter of smartphone users consumed less than 1 MB of data per month in the first quarter of 2010, down from more than a third in the first quarter of 2009.[246] Nielsen concludes from its data that "the vast majority of customers, 99 percent according to the 60,000 phone bills that Nielsen collects and analyzes every month as part of their Customer Value Metrics product, are better off with a pricing scheme like AT&T's new data pricing model than under flat-rate pricing where they are paying for much more than they ever use."[247]

---

[237] As discussed in Section IV.A.2, Prepaid Service, *infra*, AT&T's data plans for the iPad are prepaid, rather than postpaid.

[238] *Rationing Arrives*, at 2.

[239] Spencer E. Ante, *AT&T's Pricing Shift Will Test Behavior*, Wall Street Journal, June 3, 2010 (*AT&T's Pricing Shift Will Test Behavior*).

[240] *AT&T Announces New Lower-Priced Wireless Data Plans to Make Mobile Internet More Affordable to More People*, Press Release, AT&T, June 2, 2010; *AT&T's Pricing Shift Will Test Behavior.*

[241] *AT&T Announces New Lower-Priced Wireless Data Plans to Make Mobile Internet More Affordable to More People*, Press Release, AT&T, June 2, 2010; *AT&T's Pricing Shift Will Test Behavior.*

[242] *AT&T's Pricing Shift Will Test Behavior.*

[243] Roger Entner, *Quantifying the Mobile Data Tsunami and its Implications*, Nielsenwire, June 30, 2010 (*Quantifying the Mobile Data Tsunami and its Implications*).

[244] *Quantifying the Mobile Data Tsunami and its Implications.*

[245] *Quantifying the Mobile Data Tsunami and its Implications.*

[246] *Quantifying the Mobile Data Tsunami and its Implications.*

[247] *Quantifying the Mobile Data Tsunami and its Implications.*

91. After a lag of several months, first Verizon Wireless and then T-Mobile introduced tiered smartphone data plans on a promotional basis, leaving Sprint as the only remaining nationwide operator to offer only an unlimited data option for smartphones.[248] In October 2010, Verizon Wireless introduced a new limited data plan of $15 per month for 150 MB of data, half the price of its $30 per month unlimited data plan for smartphones.[249] Customers who exceed the monthly limit were charged an extra ten cents per megabyte in overage charges.[250] The new $15 plan was available to new customers with a two-year contract requirement, while existing customers have the option of moving to the less expensive limited plan or keeping their current plan. While Verizon Wireless offered the $15 plan during the holiday season, it was no longer available as of February 201,[251] and the only data plans available for new smartphone customers at that time was the $29.99 per month unlimited plan.[252] However, press reports have claimed that Verizon Wireless may move to tiered data plans in the future.[253]

92. T-Mobile announced the launch of tiered smartphone data plans at the beginning of November 2010.[254] The operator added a new less expensive plan of 200 MB of data use for $10 per month with a new two-year contract, or $15 per month with no contract extension. This is a limited time promotional offer, with the $10 price increasing to $15 after the promotion ends.[255] In addition to this new cheaper data plan, T-Mobile continues to offer an unlimited smartphone data plan for $30 per

---

[248] Simon Flannery *et al.*, *Quick Comment: T-Mobile & Verizon Tiered Data Plans Kick-Start Holiday Promos; Sprint Data Plans Now at a Premium*, Morgan Stanley, Nov. 3, 2010, at 1; Eric Zeman, *Sprint CEO: No Tiered Data Plans from Us*, PhoneScoop, Dec. 7, 2010, at http://www.phonescoop.com/news/item.php?n=7090. As of January 2011, Sprint was offering two tiers of mobile data service for the Samsung Galaxy Tab tablet device: $29.99 per month for 2 GB and $59.99 per month for 5 GB. *See* Sprint, *Mobile Broadband Plans – Tablet 3G Mobile Broadband Connection Plan*, http://shop.sprint.com/NASApp/onlinestore/en/Action/DisplayPlans?INTNAV=LEG:HE:Plans (visited Jan. 7, 2011).

[249] Roger Cheng, *Verizon Wireless to Offer $15 Data Plan*, Wall Street Journal, Oct. 19, 2010 (*Verizon Wireless to Offer $15 Data Plan*); Roger Cheng, *Verizon Wireless to Offer Cheaper Data Plan*, Wall Street Journal, Oct. 20, 2010 (*Verizon Wireless to Offer Cheaper Data Plan*).

[250] *Verizon Wireless to Offer $15 Data Plan*; *Verizon Wireless to Offer Cheaper Data Plan.*

[251] *Verizon Wireless to Offer Cheaper Data Plan*; Verizon, *Individual Plans*, http://www.verizonwireless.com/b2c/store/controller?item=planFirst&action=viewPlanList&sortOption=priceSort&typeId=1&catId=323&sel=ind (visited Feb. 16, 2011).

[252] *Verizon Wireless to Offer $15 Data Plan*; *Verizon Wireless to Offer Cheaper Data Plan*; Verizon, *Individual Plans*, http://www.verizonwireless.com/b2c/store/controller?item=planFirst&action=viewPlanList&sortOption=priceSort&typeId=1&catId=323&sel=ind (visited Feb. 16, 2011). Separate, tiered pricing plans were available at that time for mobile broadband access on tablets, netbooks, notebooks, and mobile hotspots. *See* Verizon, *Mobile Broadband Plans*, http://www.verizonwireless.com/b2c/mobilebroadband/?page=plans&lid=//global//plans//mobile%20broadband//all%20mobile%20broadband%20plans (visited Feb. 16, 2011).

[253] *Verizon Wireless to Offer $15 Data Plan*; Roger Cheng, *Verizon iPhone: $30 Unlimited Data (for Now)*, Wall Street Journal, Jan. 25, 2011, at http://blogs.wsj.com/digits/2011/01/25/verizon-iphone-30-unlimited-data/?mod=e2tw (citing statements by Verizon's Chief Operating Officer, Lowell McAdam).

[254] Associated Press, *T-Mobile USA Adds Cheaper Data Plan*, Wall Street Journal, Nov. 1, 2010; Simon Flannery *et al.*, *Quick Comment: T-Mobile & Verizon Tiered Data Plans Kick-Start Holiday Promos; Sprint Data Plans Now at a Premium*, Morgan Stanley, Nov. 3, 2010, at 1 (*Quick Comment: T-Mobile & Verizon Tiered Data Plans Kick-Start Holiday Promos; Sprint Data Plans Now at a Premium).*

[255] *Quick Comment: T-Mobile & Verizon Tiered Data Plans Kick-Start Holiday Promos; Sprint Data Plans Now at a Premium*, at 1.

month.[256] However, prior to offering its usage-based pricing promotion, T-Mobile introduced changes in its policies for data service that allow the operator to reduce a customer's data speed if his/her monthly data usage exceeds 5 GB.[257] In particular, under a provision T-Mobile added to its terms and conditions, the operator can restrict a customer's monthly data consumption after 5 GB by slowing down their connection or taking other measures to prevent their use of a disproportionate amount of bandwidth from degrading service quality and network performance for other customers.[258]

93. *Terms and Conditions*. Under the predominant postpaid handset subsidy model, customers are required to sign a one- to two-year service contract in exchange for purchasing a handset at a discount, and are subject to paying an ETF if they cancel their wireless service before the term of their service contract expires. As noted in the *Fourteenth Report*, in November 2009, Verizon Wireless differentiated its method of setting ETFs by introducing a new two-tiered structure in which the ETF for designated "advanced devices" ($350) is double the amount of the ETF for regular handsets ($175).[259] In June 2010, AT&T Wireless followed suit with the introduction of a similar, though slightly differentiated, two-tiered structure for ETFs.[260] In particular, AT&T Wireless raised its ETF from $175 to $325 on contracts signed for smartphones and cellular-connected netbook computers, while simultaneously cutting its ETF by $25 to $150 on contracts for regular handsets.[261] Like Verizon Wireless, AT&T Wireless continues to pro-rate ETFs on contracts for both smartphones and regular handsets by reducing the ETF by a fixed amount for each full month of service completed by the customer.[262]

2. Prepaid Service

94. In the United States, most mobile wireless subscribers pay their phone bills after they have incurred charges, which requires service providers to extend credit to their customers. This approach is known as postpaid service.[263] Prepaid service, in contrast, requires customers to pay for service prior to making calls. Prepaid plans typically produce lower ARPUs and higher churn rates for service providers in comparison to postpaid service.[264] For these reasons, the industry generally had not

---

[256] *Quick Comment: T-Mobile & Verizon Tiered Data Plans Kick-Start Holiday Promos; Sprint Data Plans Now at a Premium*, at 1.

[257] *Id.*; Roger Cheng, *Sprint May Cap Data Roaming on Laptops*, Wall Street Journal, June 15, 2010; *Verizon Wireless to Offer $15 Data Plan*; T-Mobile, *Additional Terms for Data Plans and Features*, http://www.t-mobile.com/Templates/Popup.aspx?PAsset=Pln_Lst_DataPlan (visited Feb. 26, 2011).

[258] T-Mobile, http://www.t-mobile.com/Templates/Popup.aspx?PAsset=Ftr_Ftr_TermsAndConditions&print=true, *July 2010 Terms and Conditions* (visited Aug. 24, 2010). If the customer's total usage exceeds five GB during a billing cycle, T-Mobile may reduce the customer's data speed for the remainder of that billing cycle. In addition, if the customer uses his or her data plan in a manner that could interfere with other customers' service, affect the operator's ability to allocate network capacity among customers, or degrade service quality for other customers, T-Mobile may suspend, terminate or restrict the customer's data session, or switch the customer to a more appropriate data plan.

[259] *Fourteenth Report*, 25 FCC Rcd at 11472, ¶ 94.

[260] Roger Cheng, *AT&T Raises Smartphone, Netbook Termination Fees*, Wall Street Journal, May 22, 1010.

[261] *Id.*

[262] *Id., Fourteenth Report*, 25 FCC Rcd at 11472, ¶ 94. Verizon Wireless reduces its $175 ETF for regular handsets by $5 per month for each full month the customer retained Verizon Wireless's service, while it reduces its $350 ETF for designated advanced devices by $10 per month for each full month of service completed by the customer.

[263] *See* Section V.A.3, Mobile Wireless Subscribers by Pricing Plan, *infra*, for information on mobile wireless subscribers by pricing plan.

[264] *Twelfth Report*, 23 FCC Rcd at 2293-94, ¶ 116.

heavily promoted prepaid offerings in the past.[265] More recently, however, the pool of unsubscribed customers qualified for postpaid plans declined to the point where prepaid offerings, which do not require credit checks, have become more attractive to more service providers.[266] In response, some service providers have introduced new prepaid plans, or entire "flanker brands," for prepaid service.[267] In some cases, providers have tailored prepaid offerings to suit segments of the market that do not want or cannot get a traditional service plan, particularly the youth market segment. As one 2009 analyst report put it, "As penetration of cellular phones has increased among more attractive demographics, providers have increasingly offered and promoted prepaid plans as they dig deeper and deeper into younger and poorer demographics to sustain growth."[268] In addition to facilities-based providers, many MVNOs offer prepaid plans rather than standard monthly billing.

95. As noted in the *Fourteenth Report*, the prepaid service segment has evolved in recent years due in part to the introduction and growth of unlimited prepaid service offerings.[269] As one analyst explained, "The prepaid market used to be fairly homogenous, with customers buying minutes ahead of time on a card, or 'European Style,' and in general far overpaying for handsets and minutes relative to postpaid customers."[270] This kept prepaid usage and ARPU low. However, with the growth of unlimited prepaid offerings, among other developments, there is a trend to lower per-minute rates and increased usage and ARPU in prepaid services. As a result, analysts stress that the market segment for prepaid service is "bifurcating" into a low-end segment and a high-end segment.[271] The low-end segment comprises traditional pay-as-you-go prepaid service, while the high-end segment encompasses unlimited ("all you can eat") prepaid offerings.

96. TracFone is generally regarded as the leader in the low-end prepaid niche.[272] Although Tracfone's rates are slightly higher on a per minute basis than those of alternative prepaid offerings, the company targets low-usage and safety-oriented customers whom other prepaid service providers are reluctant to go after because the average monthly revenue per user (ARPU) they generate, at around $10-12, is so low.[273] TracFone purchases minutes predominantly from AT&T and resells them through a national distribution network under various brands, including TracFone, Net10, and Safelink.[274] The company's phones and prepaid calling cards are sold at Wal-Mart Stores, Target, and RadioShack, in addition to drug stores and other local retail outlets.[275] Analysts attribute much of TracFone's recent subscriber growth to its Safelink offer, a program supported by the Universal Service Fund (USF) that

---

[265] *Id.*

[266] *Id.*

[267] *Id.*

[268] *Recipe for Disaster*, at 20.

[269] *Fourteenth Report*, 25 FCC Rcd at 11473-74, ¶ 98; Phil Cusick *et al.*, *Slumdog Millionaires*, Macquarie Capital, Equity Research, May 1, 2009, at 3 (*Slumdog Millionaires*).

[270] *Slumdog Millionaires*, at 3.

[271] Craig Moffett *et al.*, *U.S. Wireless Industry Scorecard: The Haves and the Have-Nots Diverge*, Bernstein Research, Nov. 6, 2009, at 1, 9 (*The Haves and the Have-Nots Diverge*); *Slumdog Millionaires*, at 4.

[272] *The Haves and the Have-Nots Diverge*, at 9; *Slumdog Millionaires*, at 1; Roger Cheng, *TracFone's Prepaid Niche*, Wall Street Journal, Mar. 4, 2009 (*TracFone's Prepaid Niche*).

[273] *TracFone's Prepaid Niche*; *Slumdog Millionaires*, at 4, 24.

[274] *Slumdog Millionaires*, at 24.

[275] *TracFone's Prepaid Niche.*

provides a free cell phone and credit for a limited amount of free monthly wireless service to eligible low-income families.[276]

97. Since the release of the *Fourteenth Report*, TracFone is facing a new challenger in the low-end prepaid segment. In May 2010, Sprint announced the introduction of a new low-end prepaid brand that it calls Common Cents Mobile.[277] Sprint's new prepaid option is a pay-by-the-minute wireless plan that the company sells through Wal-Mart. The new service charges seven cents per minute for calls and the same amount per text message – about half as much as TracFone.[278]

98. The unlimited prepaid segment includes the earliest unlimited prepaid providers, Leap and MetroPCS, and more recent unlimited prepaid players such as Sprint Nextel's Virgin Mobile and Boost Mobile prepaid brands. As noted in the *Fourteenth Report*,[279] one of the latest entrants to the unlimited prepaid segment is TracFone's "Straight Talk" service, which became nationally available in October 2009 after a limited trial service that began the previous summer.[280] As with other TracFone prepaid brands, the Wal-Mart store chain distributes Straight Talk handsets and service.[281] Unlike TracFone's other prepaid brands, however, Straight Talk runs on Verizon Wireless's network and was initially marketed with Verizon Wireless's name and logo on the box.[282] In addition, whereas other TracFone brands are targeted at low-usage customers in the traditional pay-as-you-go prepaid segment, Straight Talk's unlimited prepaid offerings are targeted at customers with higher usage and ARPU.

99. As detailed in the *Fourteenth Report*, analysts singled out Sprint Nextel's Boost Mobile prepaid brand and TracFone's Straight Talk prepaid service as being the most aggressive in cutting the price of unlimited nationwide service offerings in 2009.[283] Both Boost Mobile and Straight Talk are part of a broader movement by the nationwide mobile operators into the prepaid segment either through the sale of their own prepaid brands, as in the case of Sprint Nextel, or through resale arrangements, as with Verizon's agreement to sell network services for TracFone's Straight Talk offering.[284] In addition to Boost Mobile's unlimited prepaid offerings, Sprint Nextel's push into the prepaid segment is reflected in other recent developments such as its acquisition of Virgin Mobile USA in the fourth quarter of 2009[285] and its aforementioned introduction of a new low-end prepaid brand, Common Cents Mobile, in May 2010. Similarly, the launch of TracFone's Straight Talk service represented a shift in business strategy for Verizon Wireless, which previously had "largely avoided the prepaid market."[286]

100. The more aggressive push by the nationwide network operators into the prepaid segment continued to pressure traditional regional prepaid providers such as Leap and MetroPCS to lower their

---

[276] *The Haves and the Have-Nots Diverge*, at 10; *Slumdog Millionaires*, at 25; *TracFone's Prepaid Niche*.

[277] Niraj Sheth and Roger Cheng, *Phone Rivals Dial Up Prepaid Services*, Wall Street Journal, May 14, 2010 (*Phone Rivals Dial Up Prepaid Services*).

[278] *Phone Rivals Dial Up Prepaid Services*.

[279] *Fourteenth Report*, 25 FCC Rcd at 11475, ¶ 101.

[280] Roger Cheng, *Wal-Mart Wireless Expands*, Wall Street Journal, Oct. 15, 2009 (*Wal-Mart Wireless Expands*).

[281] *Wal-Mart Wireless Expands*.

[282] *Wal-Mart Wireless Expands*; Craig Moffett *et al.*, *Weekend Media Blast: Tilt*, Bernstein Research, Jul. 10, 2009, at 1 (*Weekend Media Blast: Tilt*).

[283] *Fourteenth Report*, 25 FCC Rcd at 11475-76, ¶ 102; *Recipe for Disaster*, at 14, 16; *Slumdog Millionaires*, at 5, 16.

[284] *Phone Rivals Dial Up Prepaid Services*.

[285] *Fourteenth Report*, 25 FCC Rcd at 11443, ¶ 34.

[286] *Phone Rivals Dial Up Prepaid Services*.

prices.[287] As detailed in the *Fourteenth Report*,[288] in the second half of 2009 first MetroPCS and then Leap responded to Boost Mobile's and Straight Talk's low-priced unlimited service offerings with two successive rounds of price cuts for certain add-on features of their unlimited local calling plans. Since then, both MetroPCS and Leap have responded yet again, this time not only by reducing their prices, but also by abandoning their original business model – local calling plans coupled with additional per-minute charges for roaming – in favor of the flat-rate nationwide coverage model that dominates the postpaid service segment.

101. In January 2010, MetroPCS unveiled new all-inclusive pricing plans that cover taxes and fees for the customer and undercut similar offerings from Sprint Nextel's Boost Mobile brand by ten dollars.[289] In addition, all the pricing plans now include unlimited nationwide talk, text and Web services, with the more expensive plans offering additional options and features for extra monthly charges.[290] In March 2010, Leap followed suit with the launch of new simplified service plans that all offer unlimited nationwide voice service, with higher monthly recurring charges for additional features such as unlimited nationwide text coverage, unlimited photo and video messaging, mobile Web services and navigation services.[291] In August 2010, Leap went a step further to match MetroPCS's new pricing plans by announcing new all-inclusive pricing plans that fold taxes and fees into the monthly recurring charge and include unlimited nationwide talk and text service.[292]

102. Other developments in the prepaid segment since the release of the *Fourteenth Report* reflect a movement by prepaid service providers to compete more aggressively for mobile service customers who use smartphones, laptops and other advanced data devices. In addition to the aforementioned changes in their pricing plans for regular devices, both MetroPCS and Leap Wireless have recently added new smartphones to their handset line-up and introduced new complementary higher-tier pricing plans for broadband devices.[293] Beginning in August 2010, Sprint Nextel's Virgin Mobile prepaid brand launched a mobile broadband plan for laptop users that offers unlimited data for $40 per month with no contract required.[294] The new all-you-can-eat service offering replaces an earlier tiered

---

[287] *Phone Rivals Dial Up Prepaid Services*; Anupreeta Das, *Leap-MetroPCS Wireless Talks Stay Stalled*, Wall Street Journal, June 6, 2010; *Fourteenth Report*, 25 FCC Rcd at 11476, ¶ 103.

[288] *Fourteenth Report*, 25 FCC Rcd at 11476, ¶ 103.

[289] *New Service Plans Starting at $40 Give Consumers Unlimited Talk, Text and Web with Local, State Taxes and Regulatory Fees Included*, Press Release, MetroPCS, Jan. 12, 2010; Roger Cheng, *MetroPCS Steps Up Wireless Price War*, Wall Street Journal, Jan. 13, 2010 (*MetroPCS Steps Up Wireless Price War*).

[290] *New Service Plans Starting at $40 Give Consumers Unlimited Talk, Text and Web with Local, State Taxes and Regulatory Fees Included*, Press Release, MetroPCS, Jan. 12, 2010.

[291] *Cricket Launches New Nationwide Coverage in all 50 States as part of Enhanced Value-Driven, Simplified Service Plans*, Press Release, Leap Wireless, Mar. 23, 2010.

[292] *Leap Lays Out Growth Plans for Prepaid Wireless Business*, Press Release, Leap Wireless, Aug. 3, 2010 (*Leap Lays Out Growth Plans for Prepaid Wireless Business*); Roger Cheng, *Leap Wireless Overhauls Plans*, Wall Street Journal, Aug. 4, 2010. (*Leap Wireless Overhauls Plans*)

[293] *Leap Wireless Overhauls Plans*; *Leap Lays Out Growth Plans for Prepaid Wireless Business*; *Leap Adds a Human Touch to the Smartphone Market With Its First Android(R) Phone, the Sanyo ZIO by Kyocera*, Press Release, Leap Wireless, Aug. 26, 2010; *MetroPCS Offers the Blackberry Curve 8530 With $60 Unlimited Talk, Text, Web and Data Service Plan*, Press Release, MetroPCS, July 23, 2010; *MetroPCS Steps Up Wireless Price War*; *New Service Plans Starting at $40 Give Consumers Unlimited Talk, Text and Web with Local, State Taxes and Regulatory Fees Included*, Press Release, MetroPCS, Jan. 12, 2010.

[294] Erika Morphy, *Virgin Mobile Gets Scrappy With Unlimited, Contract-Free Data Plan*, TechNewsWorld, Aug. 25, 2010 (*Virgin Mobile Gets Scrappy With Unlimited, Contract-Free Data Plan*).

pricing structure with data caps.[295] Leap Wireless likewise offers an unlimited prepaid broadband internet service plan for both laptops and home desktop computers at the same price point in direct competition with the Virgin Mobile service.[296] In contrast, comparable postpaid offerings from competitors are typically priced at $60 per month and usually require a two-year contract.[297] Finally, AT&T's data plans for the iPad are prepaid on a monthly basis, and do not require a one- or two-year contract.[298]

B. Non-Price Rivalry

103. In addition to price, mobile wireless service providers compete on many other dimensions. This section identifies three broad categories of non-price rivalry among mobile wireless service providers: 1) network upgrades; 2) product information and perception, which include advertising and marketing; and 3) downstream product differentiation, which includes handset/device and application offerings. Indicators of non-price rivalry, which are discussed in detail below, include technology deployment and upgrades, advertising and marketing expenditures, and handsets/devices and application offerings.

1. Network Coverage and Technology Upgrades

104. Network investment remains a centerpiece of providers' efforts to improve their customers' mobile wireless service experience. During 2009 and 2010, several providers upgraded their networks with technologies that enable faster data transfer speeds for mobile data services, while others announced plans to deploy new mobile broadband network technologies in the coming years.[299] Industry analysts and commenters have highlighted the key role that mobile broadband networks – and the products, services, and applications that rely on them – play in mobile wireless competition. As mobile voice service has become commoditized and mobile voice penetration is reaching saturation, mobile wireless service providers are differentiating themselves with the speeds, reliability, capabilities, and coverage of their mobile broadband networks and with the handsets/devices, applications, and other products and services that run on those networks.[300]

105. As a component of upgrading their networks, service providers can improve capacity, coverage, and service quality through their spectrum positions. As mentioned elsewhere, service providers have added to their spectrum holdings in recent years through the Commission's spectrum auctions, the purchase of licenses in the secondary market, and mergers and acquisitions.[301] These transactions have enabled several operators – including Leap, MetroPCS, AT&T, Verizon Wireless, and T-Mobile – to expand into new geographic areas and allowed others to upgrade networks in existing markets.[302]

106. The Commission has largely adopted flexible licensing policies that do not mandate any

---

[295] *Id.*

[296] Leap Wireless, *Cricket 3G Broadband*, http://www.mycricket.com/broadband (visited Oct. 20, 2010).

[297] *Virgin Mobile Gets Scrappy With Unlimited, Contract-Free Data Plan.*

[298] A.M. (Toni) Sacconaghi, Jr., *et al.*, *Apple: Alas, The iPad Unveiled - What Does It Mean?*, BernsteinResearch, Jan. 28, 2010, at 2-3.

[299] *See* Section IV.B.1, Service Provider Technology Deployments, *infra*.

[300] *See Fourteenth Report* 25 FCC Rcd at 11477, ¶ 106.

[301] *See* Section III.D, Entry and Exit Conditions, *supra*. Section VII.A.1, Spectrum, *infra*, also highlights the key importance of spectrum holdings in influencing service providers' network deployment costs and network capacity.

[302] *See* Section III.E, Recent Entry and Exit, *supra*, and Section VII.A.1, Spectrum, *infra*. According to T-Mobile, "the launch of the 3G network also enables T-Mobile to accommodate and serve more customers more efficiently through the use of its AWS spectrum, effectively doubling T-Mobile USA's spectrum position." *T-Mobile USA Begins Commercial 3G Network Rollout*, Press Release, T-Mobile, May 5, 2008.

particular technology or network standard for commercial mobile wireless licensees. Mobile wireless service providers have the flexibility to deploy the network technologies and services they choose as long as they abide by certain technical parameters designed to avoid radiofrequency interference with adjacent licensees.[303] As a result of this approach, different U.S. service providers have deployed, over the past 15 years, different digital network technologies with divergent technology migration paths. The two main migration paths for 2G, 2.5G, and 3G technologies have been the CDMA and GSM technology paths, as shown in Figure 2 below.[304] Certain CDMA and GSM service providers are now deploying or planning to deploy LTE technology, and some GSM operators are deploying HSPA+.[305] At least one major service provider is deploying an alternate technology, WiMAX, as discussed below.

107. When competing mobile wireless service providers deploy compatible network technologies, greater economies of scale in the production of both terminals and network infrastructure equipment can result, lowering the unit cost of handsets, chipsets, and other network equipment.[306] This, in turn, may promote more rapid adoption of mobile wireless services, and standardization tends to produce a greater variety of handsets.[307] It has been argued that the Commission's market-based approach to wireless network standards helped to encourage the development of the CDMA wireless network technology.[308] Competition among mobile wireless providers using incompatible wireless network technologies has other advantages that can benefit consumers, including increased product variety and differentiation of services, more technological competition, and tougher price competition.[309]

[303] In contrast, the European Community mandated a single harmonized standard for second-generation mobile telecommunications services (GSM), and also has adopted a single standard for third-generation services (WCDMA). Neil Gandal, *et al.*, *Standards in Wireless Telephone Networks*, Telecommunications Policy, Vol. 27, No. 5-6, June-July 2003, at 325. The authors note that, although the European Community backed away from mandating a single standard for third-generation services, the absence of a mandate has had little practical effect as all European mobile operators have opted for the same standard and migration path. *Id.* at 330.

[304] Additional information on mobile wireless network technologies, including definitions, background, and average and peak download speeds for the various technologies, can be found in Appendix B, Mobile Wireless Network Technologies, *infra.*

[305] *See* Table 11.

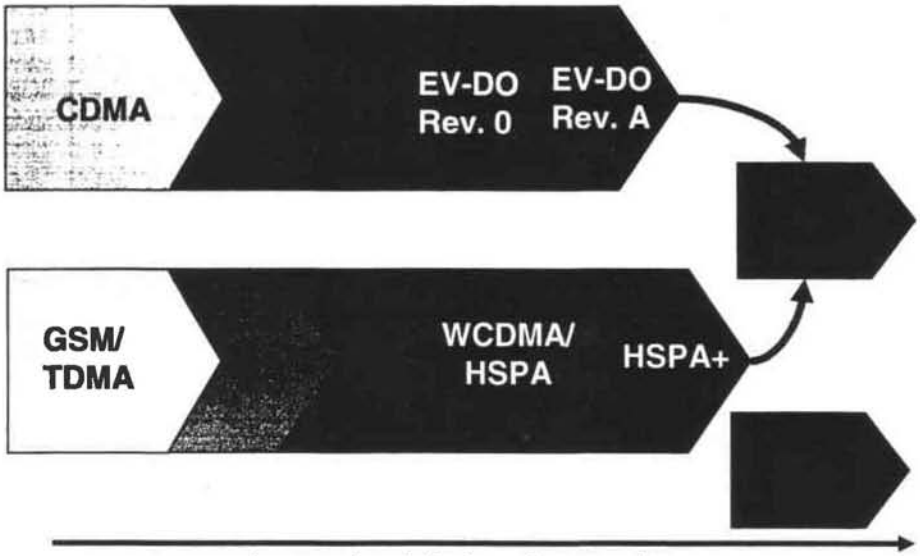
[306] *See Fourteenth Report* 25 FCC Rcd at 11478-79, ¶ 109.

[307] *See Fourteenth Report* 25 FCC Rcd at 11478-79, ¶ 109.

[308] *See Fourteenth Report* 25 FCC Rcd at 11478-79, ¶ 109.

[309] *See Fourteenth Report* 25 FCC Rcd at 11478-79, ¶ 109.

Figure 2
Mobile Wireless Network Technology Evolution



a. Service Provider Technology Deployments

108. During 2009 and early 2010, several mobile wireless service providers upgraded, or announced plans to upgrade, their networks with mobile broadband technologies. While each of the four nationwide providers has announced or begun implementing plans to offer a faster network, each has chosen a different path towards fulfilling such plans. For example, Verizon Wireless launched LTE in December 2010, Sprint Nextel is offering WiMAX through its investment in Clearwire,[310] T-Mobile and AT&T have deployed HSPA+, and AT&T plans to deploy LTE in 2011 (see Table 11).[311] For purposes of this *Report*, we include all 3G and 4G network technologies – CDMA EV-DO, EV-DO Rev. A, WCDMA/UMTS/HSPA, HSPA+, LTE, and mobile WiMAX – in our discussion of mobile broadband.[312]

---

[310] To date, Sprint's investment in Clearwire's WiMAX technology includes a $1.17 billion cash investment and the provision of spectrum and other assets valued at $7.4 billion at the time they were provided. Sprint Ex Parte Communication, WT Docket No. 05-265, Feb 7. 2011.

[311] Of the top four nationwide mobile wireless providers, AT&T and T-Mobile use GSM as their 2G digital technology and WCDMA as their 3G digital technology, while Verizon Wireless and Sprint Nextel use CDMA as their 2G technology and EV-DO Rev. A as their 3G technology. Sprint Nextel also uses iDEN on the former Nextel network as a 2G technology.

[312] The terms "3G" and "4G" are used by industry for marketing purposes, as well as by the International Telecommunications Union (ITU) for technical specifications. For example, Clearwire, T-Mobile, AT&T, and Verizon Wireless refer to their WiMAX, HSPA+, and LTE networks as "4G." However, these networks, as currently deployed, do not provide download speeds high enough to meet the ITU technical specifications of "IMT-Advanced" or "4G." Nevertheless, the ITU stated in December 2010 that the term 4G "while undefined, may also be applied to the forerunners of these technologies, LTE and WiMax, and to other evolved 3G technologies providing a substantial level of improvement in performance and capabilities with respect to the initial third generation systems now deployed." *See ITU World Radio Communication Seminar Highlights Future Communication Technologies*, Press Release, ITU, Dec. 6, 2010, *available at* http://www.itu.int/net/pressoffice/press_releases/2010/48.aspx; Sara Yin, *ITU Redefines 4G. Again*, PCMagazine, Dec. 20, 2010, at http://www.pcmag.com/print_article2/0,1217,a=258308,00.asp?hidPrint=true; Derek Kerton, *Will the Real 4G Please Stand Up?*, RCR Wireless News, Dec. 22, 2010, at http://www.rcrwireless.com/article/20101222/OPINION/101229976/analyst-angle-will-the-real-4g-please-stand- (continued....)

Table 11
3G/4G Deployment by Selected Mobile Wireless Service Providers

Service Provider	HSPA and EV-DO Deployment	LTE and WiMAX Deployment
Verizon Wireless	As of September 2010, EV-DO Rev. A network covered 289 million POPs.	In December 2010, launched LTE in 38 cities covering 110 million people. Plans to expand LTE to its entire EV-DO footprint (289 million people) by the end of 2013.
AT&T Wireless	As of early 2010, HSPA covered 230 million POPs. As of January 2011, entire HSPA network had been upgraded with HSPA+ (14.4 Mbps).	Plans to launch LTE in areas covering around 75 million people by mid-2011 and to complete its LTE buildout by year-end 2013.
Sprint Nextel	As of August 2010, EV-DO Rev. A network was available in census blocks covering 239 million POPs.	Resells Clearwire's WiMAX service.
Clearwire		As of year-end 2010, WiMAX network covered approximately 120 million people.
T-Mobile	HSPA network covered 212 million POPs as of mid-2010 and HSPA+ (21 Mbps) network covered 200 million POPs in 100 cities as of year-end 2010.	No U.S.-specific plans.
MetroPCS		As of January 2011, launched LTE in 13 cities.

109. *Verizon Wireless.* As of September 2010, Verizon Wireless had deployed EV-DO Rev. A technology – which provides advertised, typical, average download speeds of 600 kbps-1.4 megabits per second (Mbps) and upload speeds of 500-800 kbps – across portions of its network covering 289 million people.[313] In addition, in December 2010, Verizon Wireless launched its LTE network in 38 major U.S. cities covering approximately 110 million people.[314] The company claims that its LTE network provides average data rates of 5-12 Mbps downstream and 2-5 Mbps upstream.[315] In addition, LTE provides lower latency and will enable global roaming in countries where Vodafone, a major investor in Verizon Wireless, operates.[316] Verizon Wireless plans to expand LTE to its entire EV-DO footprint by the end of 2013.[317] While the company initially offered only two devices, both USB wireless modem cards, that are compatible with its LTE network, it announced in January 2011 that it plans to

(Continued from previous page)
up#. For additional information on mobile wireless network technologies, including the average and peak download speeds of the various technologies, can be found in Appendix B, Mobile Wireless Network Technologies, *infra.*

[313] Verizon Wireless, *Network Facts*, http://aboutus.vzw.com/bestnetwork/network_facts.html (visited Sept. 20, 2010). The company expanded its EV-DO coverage by 5 million POPs from its mid-2009 levels of 284 million POPs. *See Fourteenth Report*, 25 FCC Rcd at 11482, ¶ 112.

[314] *Blazingly Fast: Verizon Wireless Launches the World's Largest 4G LTE Wireless Network on Sunday, Dec. 5*, Press Release, Verizon Wireless, Dec. 4, 2010, *available at* http://news.vzw.com/news/2010/12/pr2010-12-03.html.

[315] *Blazingly Fast: Verizon Wireless Launches the World's Largest 4G LTE Wireless Network on Sunday, Dec. 5*, Press Release, Verizon Wireless, Dec. 4, 2010, *available at* http://news.vzw.com/news/2010/12/pr2010-12-03.html.

[316] *Thirteenth Report*, 24 FCC Rcd at 6254, ¶ 136.

[317] Sascha Segan and Chloe Albanesius, *Verizon Launching LTE in 38 Cities*, PC World, Oct. 6, 2010, at http://www.pcmag.com/article2/0,2817,2370344,00.asp; Verizon Wireless Comments at 12; Rob Pegoraro, *Faster Forward – 4G Forecast: More Details on Verizon's LTE Plans*, The Washington Post, Sept. 21, 2010, at http://voices.washingtonpost.com/fasterforward/2010/09/4g_forecasts_more_details_on_v.html.

begin offering ten new LTE-compatible consumer-oriented devices, including smartphones and tablets, by mid-2011.[318]

110. *AT&T.* As of early 2010, AT&T had deployed its HSPA network to areas of the country covering 230 million POPs.[319] In addition, as of January 2011, AT&T had upgraded virtually all of its existing HSPA network with an HSPA+ (14.4 Mbps) technology, which provides theoretical peak download speeds of 14.4 Mbps and, according to AT&T, can reach actual download speeds up to 6 Mbps in cell sites with enhanced backhaul.[320] AT&T also plans to deploy LTE technology beginning in 2011. The company announced in September 2010 that it had begun conducting LTE trials in Baltimore and Dallas, and that it plans to launch LTE in areas covering around 75 million POPs by mid-2011.[321] In January 2011, AT&T also stated that it expects to complete its LTE deployment by the end of 2013.[322] The company is planning to offer voice and data services on its HSPA and LTE networks simultaneously,[323] and to use both AWS and 700 MHz spectrum for its LTE deployment.[324]

111. As discussed in the *Fourteenth Report*, AT&T is also is in the process of increasing the number of high-speed backhaul connections to its cell sites in conjunction with its wireless network technology upgrades. The company is adding primarily fiber connections to its HSPA-upgraded cell sites to accommodate increased data speeds and traffic.[325] According to analysts and the company, AT&T's

---

[318] *Verizon Wireless Unveils Suite of 4G LTE Smartphones, Tablets, A MiFi Hotspot and Notebooks*, Press Release, Verizon, Jan. 6, 2011, *available at* http://news.vzw.com/news/2011/01/pr2011-01-06n.html. Sascha Segan and Chloe Albanesius, *Verizon Launching LTE in 38 Cities*, PC World, Oct. 6, 2010, at http://www.pcmag.com/article2/0,2817,2370344,00.asp.

[319] *See* AT&T, *The Truth About 3G* (television advertisements), http://www.att.com/truthabout3g/?WT.srch=1 (visited Feb. 1, 2010); *Fourteenth Report*, 25 FCC Rcd at 11484-85, ¶ 115.

[320] *AT&T Announces Plans to Deliver Nation's Most Advanced Mobile Broadband Experience*, News Release, AT&T, Jan. 5, 2011, at http://www.att.com/gen/press-room?pid=18885&cdvn=news&newsarticleid=31477&mapcode=consumer|financial. Prior to launching HSPA+ (14.4 Mbps), AT&T had upgraded its network with an HSPA 7.2 software upgrade, which supported theoretical peak download speeds of 7.2 Mbps, with actual speeds being lower and varying due to a number of factors. *AT&T Upgrades 3G Technology at Cell Sites Across Nation*, Press Release, AT&T, Jan. 5, 2010 (*AT&T Upgrades 3G Technology at Cell Sites Across Nation*).

[321] Eric Zeman, *AT&T Says LTE Roll-Out Coming Mid-2011*, InformationWeek, Sept. 16, 2010, at http://www.informationweek.com/news/telecom/voice/showArticle.jhtml?articleID=227500076&cid=RSSfeed_IWK_News; Phil Goldstein, *AT&T to Launch LTE by Mid-2011*, FierceWireless, Sept. 16, 2010, at http://www.fiercewireless.com/story/t-launching-lte-mid-2011/2010-09-16 (citing AT&T Operations CEO, John Stankey).

[322] *AT&T Announces Plans to Deliver Nation's Most Advanced Mobile Broadband Experience*, News Release, AT&T, Jan. 5, 2011, at http://www.att.com/gen/press-room?pid=18885&cdvn=news&newsarticleid=31477&mapcode=consumer|financial.

[323] Phil Goldstein, *AT&T to Launch LTE by Mid-2011*, FierceWireless, Sept. 16, 2010, at http://www.fiercewireless.com/story/t-launching-lte-mid-2011/2010-09-16 (citing AT&T Operations CEO John Stankey).

[324] *See Fourteenth Report*, 25 FCC Rcd at 11484-85, ¶ 115; Karl Bode, *AT&T Sheds More Light on LTE Plans*, Broadband DSL Reports, Oct. 21, 2010, at http://www.broadbandreports.com/shownews/ATT-Sheds-More-Light-On-LTE-Plans-111018; Mike Dano, *AT&T's Rinne Details LTE Plans: VoLTE in 2013*, FierceBroadbandWireless, Oct. 20, 2010, at http://www.fiercebroadbandwireless.com/story/ts-rinne-details-lte-plans-volte-2013-will-use-aws-and-700-mhz/2010-10-20 (both articles cite statements by Kris Rinne at 4G World trade show in Chicago).

[325] In December 2009, AT&T began the backhaul upgrades at cell sites in six cities – Charlotte, Chicago, Dallas, Houston, Los Angeles, and Miami – and announced plans to continue upgrading cell sites across its network during 2010 and 2011. *AT&T Upgrades 3G Technology at Cell Sites Across Nation*. For additional information on backhaul, see Section VII.A.3, Backhaul Facilities, *infra.*

network upgrades will improve consistency in accessing data sessions, increase efficiency, meet the rising demands on the network from bandwidth-heavy data applications, and address service quality problems – such as dropped calls, delayed text and voice messages, and slow download speeds – which typically occur during periods of peak use in dense urban areas with higher concentrations of iPhone users.[326] AT&T claims that the backhaul upgrades will also be used to support its LTE deployment.[327]

112. *Sprint Nextel/Clearwire.* Sprint Nextel operates an extensive CDMA EV-DO network covering over 239 million POPs.[328] In December 2010, Sprint Nextel announced plans to improve the quality, coverage, and speeds of its existing networks, while lowering operating costs, by consolidating its multiple technologies in multiple spectrum bands into multi-mode base stations.[329] The company plans to begin this Network Vision upgrade in 2011 and estimates that it will take three to five years to complete. In addition, Sprint Nextel is reselling the WiMAX service offered by Clearwire, in which Sprint Nextel has an ownership interest,[330] in areas of the country where Sprint Nextel also offers CDMA-based mobile wireless voice and data services.[331] During 2009 and 2010, Sprint Nextel began offering several dual-mode devices – including smartphones, laptop cards, and mobile Wi-Fi hotspots – that are compatible with both Clearwire's WiMAX and Sprint Nextel's EV-DO network.[332]

113. As of the end of 2010, Clearwire's WiMAX network covered approximately 120 million POPs, up from 10.1 million POPs in September 2009.[333] In addition to being resold by Sprint Nextel, Clearwire's WiMAX high-speed Internet access service is resold by companies such as Comcast and Best Buy, as well as directly under the CLEAR brand.[334] Clearwire has reported that it plans to "aggressively"

---

[326] *See Fourteenth Report*, 25 FCC Rcd at 11484-85, ¶ 115; *AT&T Upgrades 3G Technology at Cell Sites Across Nation.*

[327] *AT&T Upgrades 3G Technology at Cell Sites Across Nation.*

[328] According to the August 2010 American Roamer database, Sprint Nextel's EV-DO network has been deployed in census blocks covering 239 million people.

[329] *Sprint Announces Network Vision – A Cutting-Edge Network Evolution Plan with Partners Alcatel-Lucent, Ericsson, and Samsung*, Press Release, Sprint Nextel, Dec. 6, 2010, *available at* http://newsroom.sprint.com/news/sprint-announces-network-vision-network-evolution-plan.htm; Kulbinder Garcha, *et al.*, *Sprint Announces Details of Its Network Vision Project – Implications for Wireless Infrastructure Sector*, CreditSuisse, Equity Research, Dec. 6, 2010.

[330] As discussed above, Sprint Nextel currently holds a majority ownership interest in Clearwire and has the ability to nominate 7 of the 13 board members. *See* Section III.E, Recent Entry and Exit, *supra.*

[331] *See* Sprint Nextel, SEC Form 10-K, filed Feb. 26, 2010, at 1-3.

[332] Sprint Nextel, SEC Form 10-Q, filed Aug. 5, 2010, at 19-20; *Fourteenth Report*, 25 FCC Rcd at 11483, ¶ 113.

[333] Sprint Nextel, SEC Form 10-Q, filed Aug. 5, 2010, at 19; Clearwire, SEC Form 10-Q, filed Aug. 5, 2010, at 23; Clearwire, SEC Form 10-K, filed Feb. 24, 2010, at 6-7; AT&T Comments at 45; *Fourteenth Report*, 25 FCC Rcd at 11485-86, ¶ 117; Eric Zeman, *Top 11 Mobile Predictions for 2011*, InformationWeek, Jan. 20, 2011, at http://www.informationweek.com/news/smb/mobile/showArticle.jhtml?articleID=228900152&cid=RSSfeed_IWK_News.

[334] Clearwire, SEC Form 10-K, filed Feb. 24, 2010, at 6-7; Clearwire, *CLEAR Super Fast Mobile Internet*, http://www.clear.com/ (visited Sept. 23, 2010); Comcast, *Internet 2go Coverage Areas*, http://www.comcast.com/Corporate/Learn/xfinity/4g-3g-wireless-coverage-map.html (visited Sept. 24, 2010); Best Buy, *Internet on the Go – Best Buy Connect*, http://www.bestbuy.com/site/Computers+Promotions/null/pcmcat214600050004.c?id=pcmcat214600050004 (visited Feb. 16, 2011); *Fourteenth Report*, 25 FCC Rcd at 11485-86, ¶ 117. Comcast and Bright House Networks hold an ownership interest in Clearwire. *See* Section III.E.1, Entry, *supra.*

grow its wholesale business during 2011, while continuing its retail distribution model.[335] Clearwire's WiMAX network operates on spectrum in the 2.5 GHz band using its BRS licenses and EBS spectrum leases, and the company claims that its WiMAX network provides average download speeds of 3-6 Mbps with burst rates up to 10 Mbps.[336] While Clearwire's current network employs WiMAX technology, the company announced in August 2010 that it is conducting trials of both TDD and FDD LTE technologies in the 2.5 GHz spectrum band and testing coexistence scenarios of WiMAX and LTE in that band.[337] According to Clearwire, a test in Phoenix yielded download speeds of 20-70 Mbps, substantially higher than the 5-12 Mbps expected download speeds announced by other providers that plan to launch LTE.[338]

114. *T-Mobile*. T-Mobile, like AT&T, is deploying HSPA and HSPA+ technology across its mobile wireless network. At the end of 2009, T-Mobile's HSPA network covered 205 million POPs, nearly the double the number covered at the end of 2008.[339] As of August 2010, T-Mobile's HSPA network coverage had expanded to 212 million POPs.[340] In January 2010, the company announced that its HSPA 7.2 Mbps upgrade had been completed across its entire HSPA network.[341] In the fourth quarter of 2009, T-Mobile also launched HSPA+ (21 Mbps) technology in its Philadelphia network and had expanded its HSPA+ footprint to 200 million POPs in 100 markets as of the end of 2010.[342] The version of HSPA+ that T-Mobile is deploying has theoretical maximum peak speed of 21 Mbps downlink and 5.7 Mbps uplink.[343] The company claims that the actual HSPA+ speeds it offers are comparable to those of currently-deployed WiMAX and LTE networks and is now marketing this technology as "4G."[344]

---

[335] *Clearwire Reports Record Fourth Quarter and Full 2010 Growth*, Financial Release, Clearwire, Feb. 17, 2011, *available at* http://investors.clearwire.com/phoenix.zhtml?c=214419&p=irol-newsArticle&ID=1530258&highlight=.

[336] Clearwire, *What is WiMAX?*, http://www.clear.com/discover?intcmp=index_d_prmnav_dis (visited Sept. 23, 2010); *Fourteenth Report*, 25 FCC Rcd at 11485-86, ¶ 117.

[337] *Clearwire Announces New 4G LTE Technology Trials Expected to Yield Unmatched Wireless Speeds in the U.S.*, Press Release, Clearwire, Aug. 4, 2010. (*Clearwire Announces New 4G LTE Technology Trials Expected to Yield Unmatched Wireless Speeds in the U.S*).

[338] *Clearwire Announces New 4G LTE Technology Trials Expected to Yield Unmatched Wireless Speeds in the U.S.*

[339] *T-Mobile USA Reports Fourth Quarter and Full Year 2009 Results*, Financial Release, T-Mobile, Feb. 26, 2010 (*T-Mobile USA Reports Fourth Quarter and Full Year 2009 Results*), *available at* http://s.tmocache.com/Cms/Files/Published/0000BDF20016F5DD010312E2BDE4AE9B/5657114502E70FF301270BB668BE399A/file/TMUS%20Q4%20Press%20Release%20FINAL.pdf.

[340] T-Mobile Reply at 1.

[341] Eric Zeman, *T-Mobile Upgrades to HSPA 7.2Mbps, First to Deploy HSPA+*, PhoneScoop, Jan. 5, 2010, at http://www.phonescoop.com/news/item.php?n=5310.

[342] *T-Mobile USA Reports Fourth Quarter and Full Year 2009 Results*; *T-Mobile USA Reports Second Quarter 2010 Results*, Financial Release, T-Mobile, Aug. 5, 2010 (*T-Mobile USA Reports Second Quarter 2010 Results*), *available at* http://www.t-mobile.com/Cms/Files/Published/0000BDF20016F5DD010312E2BDE4AE9B/5657114502E70FF3012A436A0A85BF12/file/TMUS%20Q2%202010%20Press%20Release%20FINAL.pdf; Eric Zeman, *Top 11 Mobile Predictions for 2011*, InformationWeek, Jan. 20, 2011, at http://www.informationweek.com/news/smb/mobile/showArticle.jhtml?articleID=228900152&cid=RSSfeed_IWK_News.

[343] *Fourteenth Report*, 25 FCC Rcd at 11485, ¶ 116; T-Mobile, *Moments fly by. So should download times*, http://t-mobile-coverage.t-mobile.com/# (visited Sept. 29, 2010); CTIA Comments at 10.

[344] *T-Mobile USA Reports Second Quarter 2010 Results*; T-Mobile Reply at 1; CTIA Comments at 10-11; Verizon Wireless Comments at 12. While T-Mobile had launched its HSPA+ 21 Mbps network at the writing of the *Fourteenth Report*, the company had not yet identified this network as "4G."

115. *Other CDMA Operators.* Apart from Sprint Nextel and Verizon Wireless, 29 other smaller, regional and multi-metro CDMA operators also had deployed EV-DO or LTE technology within their networks as of August 2010.[345] MetroPCS, which never upgraded its CDMA network with EV-DO technology, became the first mobile wireless service provider to launch LTE in the United States in September 2010.[346] As of January 2011, the operator had deployed LTE in 13 cities.[347] In addition, Leap has deployed EV-DO across its entire network footprint, which covered approximately 94.2 million POPs at the end of 2009.[348] Leap's EV-DO covered POPs increased 41 percent during 2009 from 67 million at the end of 2008.[349] In addition, US Cellular's EV-DO network has grown from covering five markets at the end of 2008 to covering 75 percent of its customer base as of December 30, 2009.[350] The company plans to expand EV-DO to 90 percent of its customer base at the end of 2010.[351] The EV-DO networks of the non-nationwide CDMA providers combined had been deployed in census blocks covering 117 million people, or 41 percent of the U.S. population, as of August 2010.[352]

116. *LightSquared.* In July 2010, Harbinger Capital Partners, which acquired MSS licensee SkyTerra in March 2010, announced plans to build an integrated satellite/terrestrial LTE network under the name LightSquared that will provide coverage through its terrestrial network to at least 100 million U.S. POPs by the end of 2012, at least 145 million POPs by the end of 2013, and to at least 260 million POPs by the end of 2015.[353] LightSquared plans to achieve this by ultimately deploying, through a contract with Nokia, approximately 40,000 base stations by the end of 2015.[354] LightSquared plans to use

---

[345] American Roamer database, Aug. 2010.

[346] *MetroPCS Launches First 4G LTE Services in the United States and Unveils World's First Commercially Available 4G LTE Phone*, Press Release, MetroPCS, Sept. 21, 2010, *available at* http://investor.metropcs.com/phoenix.zhtml?c=177745&p=irol-newsArticle&ID=1473355&highlight=; *MetroPCS Launches Commercial 4G LTE Services in the Dallas/Fort Worth Metroplex*, Press Release, MetroPCS, Sept. 29, 2010, *available at* http://investor.metropcs.com/phoenix.zhtml?c=177745&p=irol-newsArticle&ID=1475926&highlight=. At the same time MetroPCS launched its LTE network, the company also began offering the first commercially available, dual-mode LTE/CDMA device in the United States, the Samsung Craft. For more information, *see* Section IV.B.3, Differentiation in Mobile Wireless Handsets/Devices, *infra*.

[347] The cities, in order of launch, are: Las Vegas, Dallas, Detroit, Los Angeles, Philadelphia, San Francisco, Boston, New York, Sacramento, Atlanta, Jacksonville, Miami, and Orlando. *MetroPCS Launches First 4G LTE Services in the United States and Unveils World's First Commercially Available 4G LTE Phone*, Press Release, MetroPCS, Sept. 21, 2010; *MetroPCS Launches 4G LTE Service in Atlanta, Jacksonville, Miami and Orlando Metropolitan Areas*, Press Release, MetroPCS, Jan. 25, 2011.

[348] Leap Wireless International, Inc., SEC Form 10-K, filed Mar. 1, 2010, at 2.

[349] *Fourteenth Report*, 25 FCC Rcd at 11483-84, ¶ 114.

[350] United States Cellular Corp., SEC Form 10-K, filed Feb. 25, 2010, at 7; *Fourteenth Report*, 25 FCC Rcd at 11483-84, ¶ 114 (US Cellular initially launched EV-DO in Milwaukee; Chicago; Des Moines; Tulsa, and southern Wisconsin.

[351] United States Cellular Corp., SEC Form 10-K, filed Feb. 25, 2010, at 7.

[352] American Roamer database, Aug. 2010.

[353] *See SkyTerra/Harbinger*, 25 FCC Rcd at 3085, 3088-89, 3098-99, ¶¶ 56, 72, App. B (Attach. 2 at 1-2). LightSquared is the venture arising out of this transaction.

[354] *See* http://www.lightsquared.com/press-room/press-releases/lightsquared-announces-chipset-partnership-and-initial-device-manufacturers/ (last visited Feb. 16, 2011); *see also* Kevin Fitchard, *New LTE Network Embraces the 'Dumb Pipe,'* Connected Planet, July 20, 2010 (*New LTE Network Embraces the 'Dumb Pipe'*); Greg Bensinger, *Falcone's LightSquared to Challenge Clearwire with 4G in Chicago, Dallas*, Bloomberg, Aug. 31, 2010, (*Falcone's LightSquared to Challenge Clearwire with 4G in Chicago, Dallas*) at http://www.bloomberg.com/news/2010-08-31/falcone-s-lightsquared-to-challenge-clearwire-with-4g-in-chicago-dallas.html; Tracy Ford, @ *PCIA: LightSquared Details Device Plans, NSN Network Buildout*, RCR Wireless News, Oct. 7, 2010, at (continued....)

a wholesale business model in which it will offer LTE and satellite connectivity to other wireless network operators, cable operators, consumer electronics companies, and other technology companies.[355]

117. *Use of Distributed Antenna Systems (DAS) and Femtocells.* In addition to upgrading their networks for mobile broadband systems, mobile wireless operators are also taking steps to improve indoor coverage through the use of new technologies such as distributed antenna systems (DAS) and femtocells.[356] DAS provides enhanced coverage in highly trafficked areas such as shopping malls and office buildings. Femtocells are personal cell sites that can be installed in a consumer's home that receive cell phone signals within the home and nearby area and use an in-home broadband connection for the last-mile transport of calls and data transmissions.[357] Several mobile wireless operators have made femtocells available to their customers to improve coverage in areas that might not otherwise have it.[358]

b. Coverage by Technology Type

118. Using a census block level analysis of American Roamer data,[359] we are able to estimate coverage by air interface type in the approximately 8 million census blocks.[360] As of July 2010, virtually the entire population of the United States lived in census blocks where operators provide digital mobile wireless coverage using CDMA, GSM/TDMA, or iDEN (including their respective next generation technologies), or some combination of the three.[361] As shown in Table 12 below, CDMA and GSM/TDMA have been deployed in census blocks containing 283 million and 282 million people, respectively. iDEN coverage is more limited, available in census blocks covering 259 million people, or 91 percent of the U.S. population. A map showing coverage by mobile wireless digital technologies can be found in Appendix D, Map D-23. Compared with the network technology coverage reported in the *Fourteenth Report*, CDMA coverage remained unchanged while GSM and iDEN coverage increased slightly, from 98 to 99 percent of the U.S. population for GSM, and from 88 to 91 percent of the population for iDEN.[362] In October 2010, Sprint Nextel reported that it would eventually shut down its iDEN network.[363]

(Continued from previous page) ———————————
http://www.rcrwireless.com/ARTICLE/20101007/CARRIERS/101009964/-pcia-lightsquared-details-device-plans-nsn-network-buildout; *LightSquared Could Cover Nine Metro Areas with LTE During 2011*, Cellular-News, Sept. 1, 2010, at http://www.cellular-news.com/story/45143.php.

[355] *See SkyTerra/Harbinger Order*, 25 FCC Rcd at 3085, ¶ 55; LightSquared Subsidiary LLC Request for Modification of its Authority for an Ancillary Terrestrial Component, SAT-MOD-20101118-00239, Call Sign: S2358, *Order and Authorization*, 26 FCC Rcd 566, at 569, ¶ 6 (International Bureau 2011) (granting conditional waiver of ATC "integrated service" rule and modification of LightSquared's ATC authority). *See also Falcone's LightSquared to Challenge Clearwire with 4G in Chicago, Dallas; New LTE Network Embraces the 'Dumb Pipe'*..

[356] *See Fourteenth Report*, 25 FCC Rcd at 11479, ¶ 110.

[357] *Id.*

[358] *Id.*

[359] *See* Section III.C.1, Number of Competitors, *supra*, for a discussion of the limitations of American Roamer data.

[360] By utilizing such a small geographic area to analyze technological availability, we are able to minimize the concerns regarding the over-counting of population and geographic area covered that were inherent in previous reports' county-based analyses (there are approximately 3,200 in the United States). *See* Section III.C.1, Number of Competitors, *supra*.

[361] Because service providers may provide coverage solely to service customers based elsewhere, the existence of coverage in an area does not necessarily mean that consumers living in those areas have the option of subscribing to each of the service providers. *See supra* note 109.

[362] *See Fourteenth Report*, 25 FCC Rcd at 11486-87, ¶ 118, Table 12.

[363] Phil Goldstein, *Hesse: Sprint Eventually Will Shut Down iDEN*, FierceWireless, Oct. 27, 2010, at http://www.fiercewireless.com/story/sprints-hesse-iden-shutdown-coming-eventually/2010-10-
(continued....)